USING THE RESOURCES AT HAND:

SUSTAINABLE EXHIBITION DESIGN

A PROJECT OF THE CENTER FOR SUSTAINABLE CURATING

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ACKNOWLEDGEMENTS

Research for *Using the Resources at Hand* was conducted by the Centre for Sustainable Curating, the Synthetic Collective, Ioana Dragomir, and Noémie Fortin. This project is overseen by Dr. Kirsty Robertson, Director of the CSC.

Design by Anahí González, updated by Imogen Clendinning.

Funding for this project was provided by Western University, Canada and the Social Sciences and Humanities Research Council of Canada.

Research, writing, and design of this booklet took place in London, Ontario/Deshkaan Ziibi on the traditional lands of the Anishinaabeg, Haudenosaunee, Lūnaapéewak, and Neutral (Chonnonton) peoples, on lands connected to several Treaties including Treaty 6 London Township, Treaty 7 Sombra Township, Treaty 21 Longwoods and the Dish with One Spoon Wampum Belt Covenant.

MUSEUMS AND GALLERIES HAVE SIGNIFICANT CARBON FOOTPRINTS AND CREATE EXTENSIVE AMOUNTS OF WASTE.

INTRODUCTION

Every step of exhibition design, from the initial organization to the deinstallation, can benefit from a lower carbon footprint.

Using the Resources at Hand is designed primarily to help students in the Department of Visual Arts at Western University think about eco-friendly options in designing exhibitions. Skills learned here can also be used elsewhere, and can help to make the cultural sector more sustainable over the long term. The guide offers tips for low-carbon design, outlines resources available locally, and includes information on borrowing and sharing resources and materials so that we can reduce and reuse within the department.

If you are from an established museum and reading this - welcome! The CSC is working on a guide for institutions in Canada, but you might find some useful information here, and there is also a list of other resources in the *Learn More* section. Please feel free to email us at sustainable.curating@uwo.ca with questions.

Using the Resources at Hand is open-source and can be adapted and used by anyone hoping to share information about ecologically-friendly forms of exhibition design. We're happy to share the InDesign source files if you would like to adapt this guide to your own location.

As the Synthetic Collective writes, "low carbon exhibitions require extra planning, innovation, and shifting of some of the aesthetic standards of traditional exhibitions. Such approaches should be seen as in line with a global turn in curating towards socially-engaged projects and slow curating. Take the pressure off yourself and take some pressure off the climate."

Synthetic Collective. *Synthetic Collective DIY Fieldguide for Reducing the Environmental Impact of Art Exhibitions*, 2020

WHY IS THIS IMPORTANT HERE AND NOW?

The Great Lakes watershed contains close to 21% of the world's surface freshwater reserves, but faces heavy pollution from industry, manufacturing, and agriculture. Chemical pollution, plastic pollution, and nutrient pollution have been devastating to the Great Lakes. We live here, work here, and go to school here, and our actions have consequences.

Many cities in Ontario, including London, are running out of space in their landfills. Creating less waste is a much better solution than building new landfills.

Plastics manufacturing in the Great Lakes region is linked with poor air and water quality. Exhibition-making uses extensive plastics, but we can change this.

Treaty responsibilities and obligations invoked in the territorial acknowledgment included in *Using the Resources at Hand* call on those living in London to work toward improving water quality in the Thames River/Deshkaan Ziibi, preventing waste export and landfills being built on Indigenous territory, and resisting air, land, and water pollution in the region.

ACTIONS

ORGANIZATION

Even the smallest changes can make an overall difference.

Everything from sending emails to designing floor plans uses energy. Online doesn't always mean "greener. "

The carbon footprint of devices and personal computers, as well as the Internet and the systems supporting it, account for about 3.7% of total global greenhouse emissions.

PLANNING

Thumbnail images, smaller documents, and other low-res/ low-energy solutions can lower overall energy footprints.

QUESTION

What impact is your exhibition going to have? How can you convey your ideas and display art in ways that won't have long term waste impacts?

MEETINGS

While undergraduate exhibitions likely won't involve a lot of travel, extensive travel is one of the biggest contributors to the carbon output of the art world.

Is it possible to walk or take public transit to a meeting or class?

Phone calls and video-free communications are excellent alternatives to energy intensive programs like Zoom. Turn off your video! It makes a big difference!

Poor planning and leaving everything until the last minute often results in waste as hasty decisions are made. Eco-conscious exhibitions take careful time-management and allocation of resources.

MAKING

What are the long-term impacts of the industrial processes used in making all of the materials used in the exhibition? Knowing what materials are made of and where they come from can lead to more ecologically-friendly choices.

Is it possible to salvage materials, or to re-use materials from previous exhibitions or artworks? Re-using is always better than buying new.

Think about scale: is large scale necessary? In most circumstances scale is linked to energy and materials consumption. While large scale is sometimes necessary, small scale can still have high impact!

Collaborating with the gallery, other students, and other classes, can lead to trades and re-use of materials.

Researching and choosing low-impact materials when new materials are required is essential. This includes paints made from natural substances with no added plastics, unbleached paper, and printing on recycled paper with non-toxic inks (see the Resources pages).

Low-resolution and low-frequency can affect overall carbon footprints.

The Department of Visual Arts has extensive equipment that can be borrowed and shared by all students. If there is something missing, let us know. Sharing equipment, materials, and technology is a goal of the CSC.

Can your electronics be powered with a solar charger? The CSC has a charging kit that can be loaned for exhibitions in the Artlab or Cohen Commons.

ECO-DESIGN

Catalogues and brochures are important elements of exhibition design. Here are some tips to keep file sizes small:

- Using high res images is the norm in publishing, but they are not always necessary, especially for online publication. Low res images can lessen file size drammatically (see pgs 15-24).
- Image dithering can render images even smaller (see pgs 50-55).
- Default fonts minimize conversion times and data use (p. 31).
- Compression of final PDF leads to faster downloads.
- Limiting colour choices leads to smaller file size and can be helpful for eco-printing with soy-based inks.
- Avoiding graphics-heavy design aesthetics can lessen file size.
- If possible, circulating your catalogue as a small pdf file avoids introducing new material objects to the world. However, sometimes printing is necessary.
- Eco-friendly printing companies are included in the Sustainable Companies list at the end of the Resource guide.

PACKING

See the *Learn More* section for information for institutions on shipping art works. Because of insurance and loan agreements, institutions have specific requirements for shipping, and groups like Ki Culture and Gallery Climate Coalition have resources for packing and shipping exhibitions and artworks over long distances.

Are you shipping your own work to an exhibition? If so, you likely have more control than you might think over the materials you use to pack the work. See the *Resources* section for ideas, and note that students have successfully packed work in newsprint, wool batting, biodegradable packing peanuts, and other natural materials. The CSC also has used bubble wrap that can be borrowed (and returned if possible). If it's your own work and you're comfortable using twine rather than tape, this will definitely extend the life of the bubble wrap.

Is the work being shipped locally? It won't come as a surprise that transporting work on foot is best, followed by bicycle, car, and then van.

If the work is being shipped internationally, see the Gallery Climate Coalition (url in *Learn More*) advice on sea vs. air. Although freight shipping is not without environmental consequences, if it's possible it usually has a much lower carbon footprint. It can be very difficult to organize freight shipping from Canada. It isn't impossible, but keep in mind that schedules need to be very flexible.

The best practice is to minimize travel whenever possible. If travel must be undertaken, try to have more than one reason: i.e. combine shipments, send the work with someone who is traveling already, use the trip for other reasons, only travel once (i.e. for installation OR for the opening).

Some technologies can be recharged using the CSC's portable solar charger. Be aware that using the solar charger requires planning and sunshine. Make sure you know when the charging will take place.

Limiting the scale of video works to smaller screens (i.e. tablets) uses a much lower wattage than projectors or televisions.

Creating low-resolution video for smaller screens, and planning sound/audio for lower energy requirements (e.g. low frequency sound requires less energy than high frequency sound) can lessen the energy consumption of the exhibition as a whole.

TECHNOLOGY

QUESTION

Balancing energy consumption with creating powerful exhibitions is a difficult task. How can we inspire without causing further harm?

CARBON OFFSETS

The CSC recommends *against* using carbon offsets (for example, calculating carbon output of an exhibition and purchasing credits for reforestation) as they have been shown not to work and can lead to profligate pollution. The CSC is currently working on a project on local alternatives to carbon offsets. What might an exchange that focuses on local remediation and pollution reduction as part of curatorial projects look like?

Conclusion: Building sustainability into exhibitions involves a constant process of learning, unlearning, and self-criticality. Difficult decisions must be made and new forms of exhibition-making privileged.

Vinyl PVC lettering is frequently used in exhibitions because it is cheap and looks professional. However, PVC is highly toxic and does not biodegrade, remaining in the world for at least 1000 years.

DIDACTICS

Greener alternatives take three factors into account:

- *The materials used (plastic, paint, paper, etc.)*
- *The quantity of materials needed*
- *The overall need for a text to be printed*

A major issue with vinyl lettering is that a whole sheet is used to make the labels. All of the negative space becomes waste that is toxic and takes centuries to break down. There are many alternatives:

Make a map of the gallery and customize it with the placement of the artworks and the information that would usually go on a label.

There are many options for hand-making labels including: writing labels in natural inks or watercolours (make sure the writing meets accessibility critieria). Experimental options include using stencils and light to fade construction paper, cyanotypes, cut paper or magazines wheat pasted on the wall, light and shadow, and projections.

Write with a pencil or pencil crayon directly on the wall.

Hiring professionals to hand-paint the text and signage directly on the wall is a costly but visually impressive alternative to vinyl labels and title walls.

Use custom stencils made by laser cutting paper (preferably recycled) - this can be done on the vinyl cutter in the department.

Use a direct-to-substrate dye-sublimation printing method directly on a panel made of sustainable materials (recycled, recyclable, or biodegradable) to print labels, exhibition title, and other didactics.

Plastic-free adhesive wall lettering and signage exists but is difficult to find.

Digital labels.

EXAMPLES

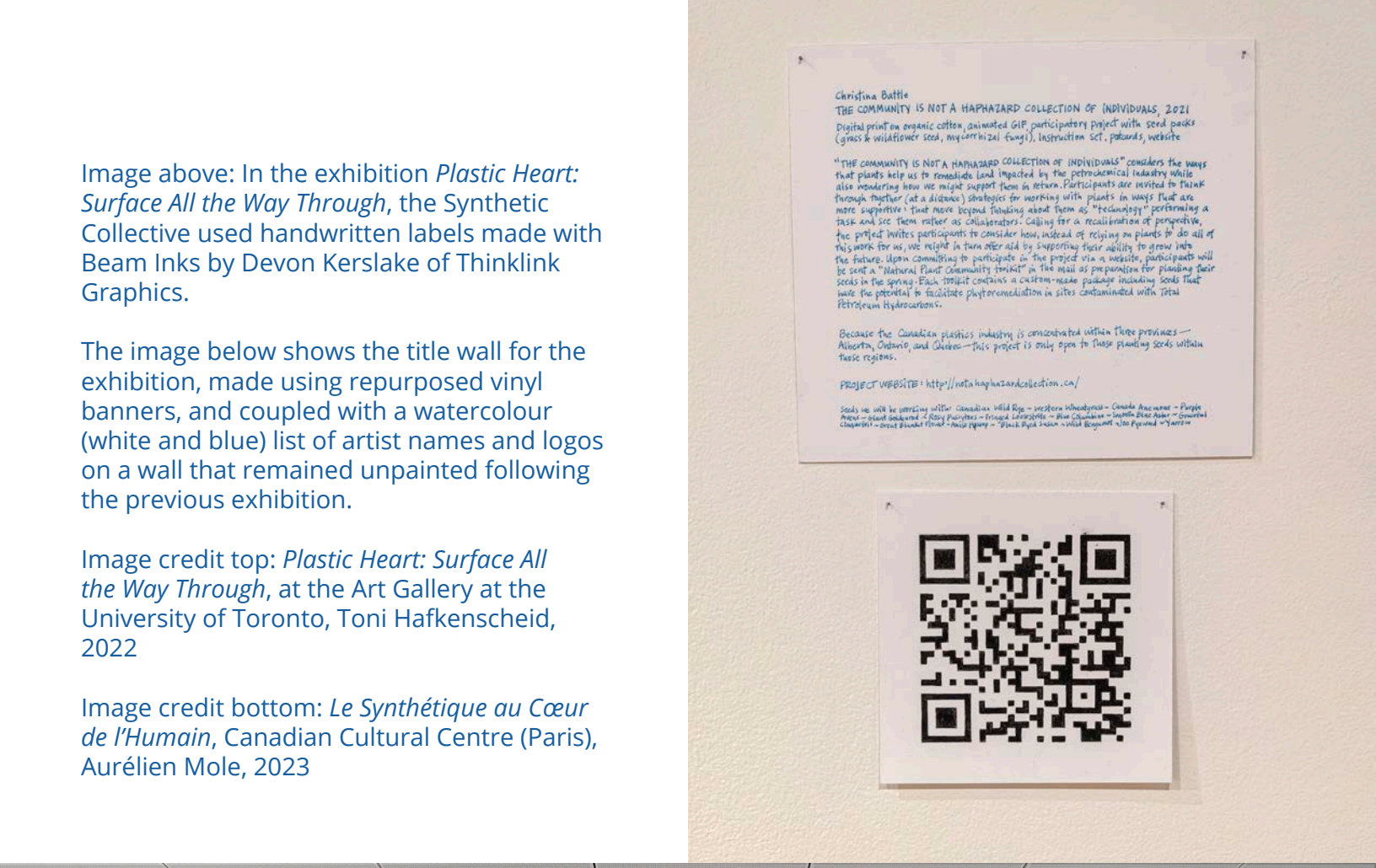
MANY MUSEUMS, GALLERIES, AND ARTISTS IN SOUTHWESTERN ONTARIO HAVE STARTED EXPERIMENTING WITH MORE ENVIRONMENTALLY FRIENDLY DIDACTICS. HERE ARE SOME EXAMPLES WITH REPLICABLE INSTRUCTIONS. TO KEEP THE FILE SIZE LOW, AND TO FURTHER DEMONSTRATE ECO-DESIGN TECHNIQUES, THE IMAGES IN THIS SECTION HAVE ALL BEEN REDUCED IN SIZE TO 150DPI (PUBLICATIONS TYPICALLY USE 300 DPI MINIMUM). NONETHELESS, THE IMAGES INCREASED THE FILE SIZE OF THE GUIDE FROM UNDER 1MB TO OVER 8MB.

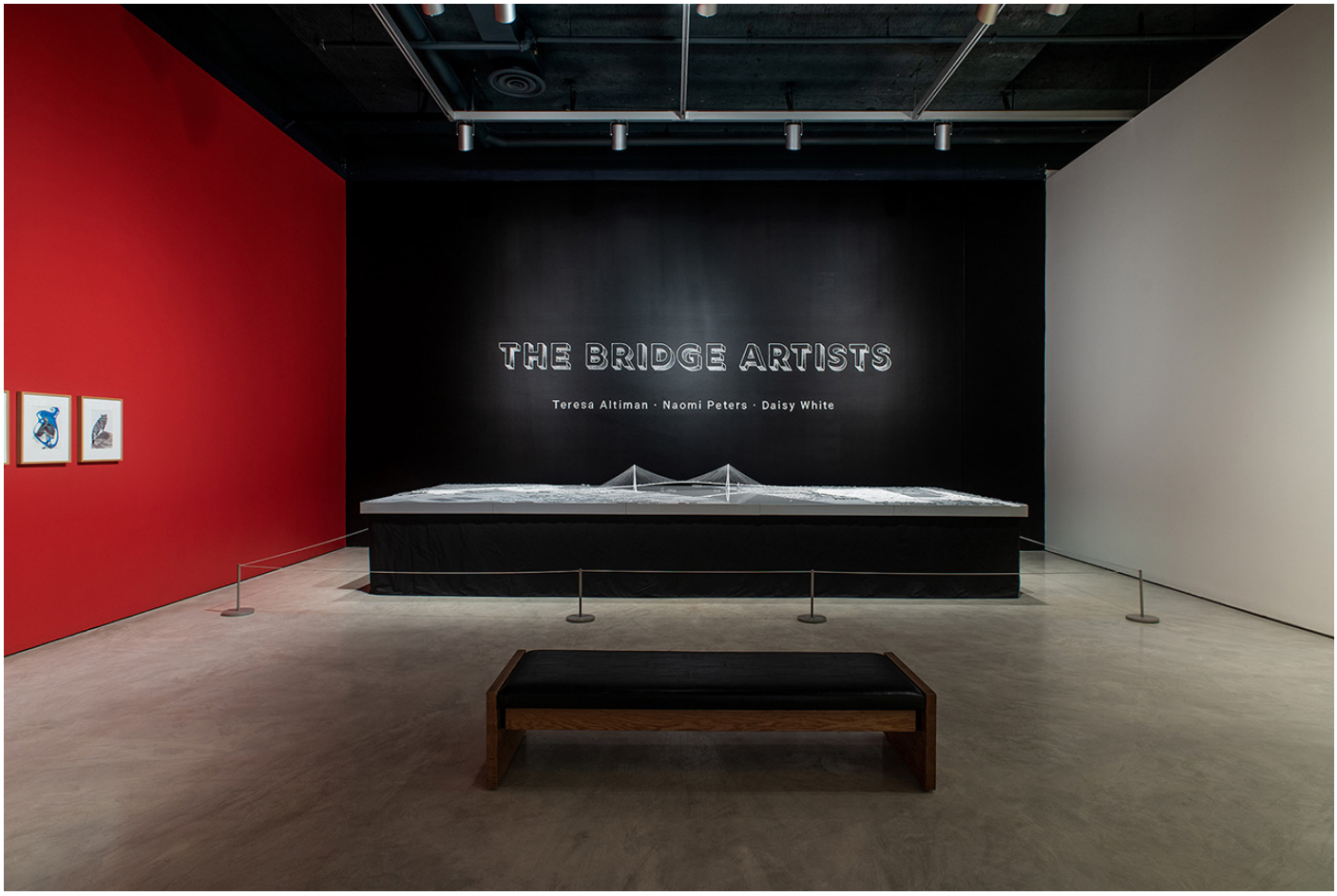
Image above: In the exhibition *Plastic Heart: Surface All the Way Through*, the Synthetic Collective used handwritten labels made with Beam Inks by Devon Kerslake of Thinklink Graphics.

The image below shows the title wall for the exhibition, made using repurposed vinyl banners, and coupled with a watercolour (white and blue) list of artist names and logos on a wall that remained unpainted following the previous exhibition.

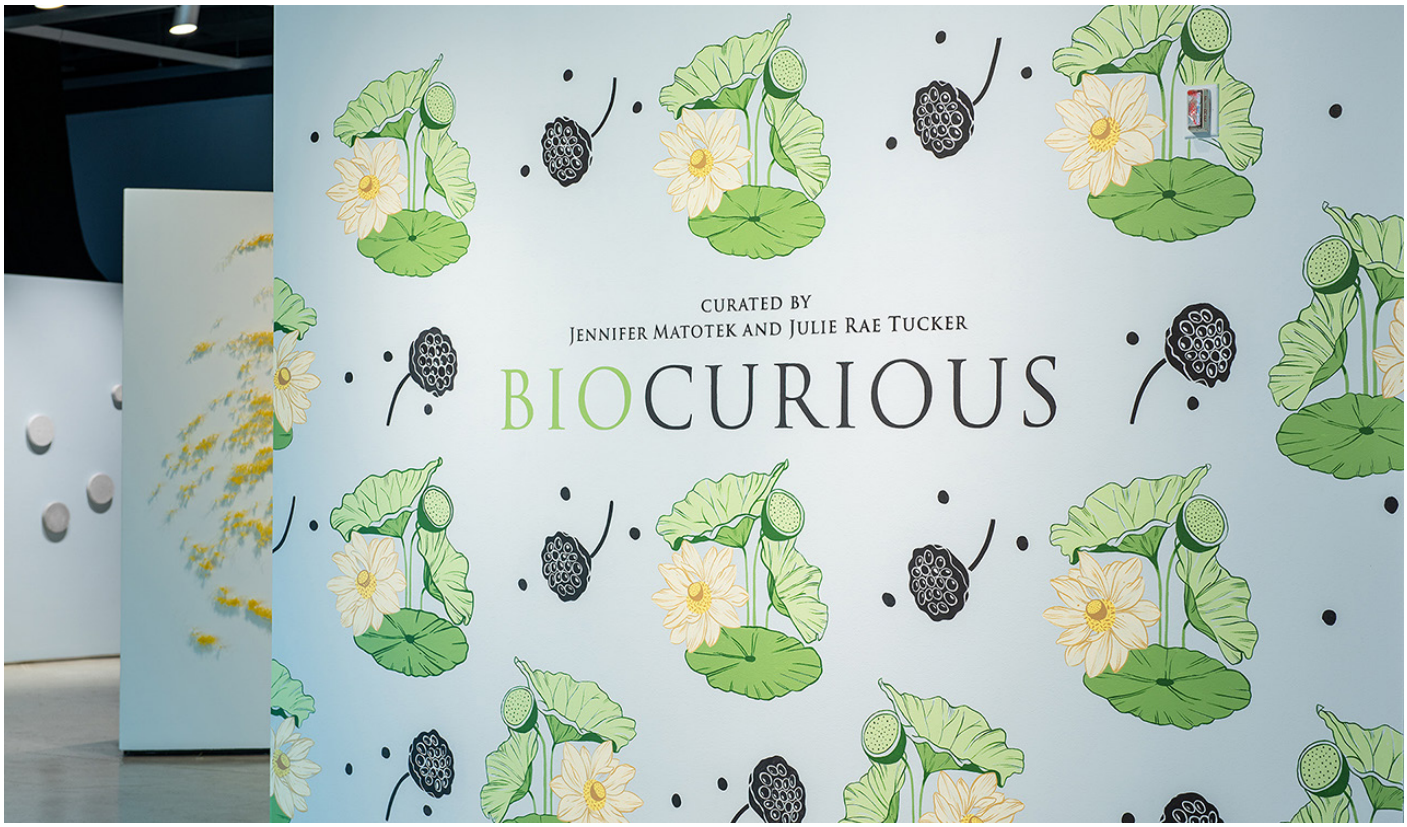
Image credit top: *Plastic Heart: Surface All the Way Through*, at the Art Gallery at the University of Toronto, Toni Hafkenscheid, 2022

Image credit bottom: *Le Synthétique au Cœur de l'Humain*, Canadian Cultural Centre (Paris), Aurélien Mole, 2023





Images: Art Windsor Essex has largely stopped using vinyl for exhibition didactics. These title walls, designed by artist Julie Hall show the use of chalk (top) and low VOC latex paint (bottom). Photography by: Frank Piccolo, Windsor, ON



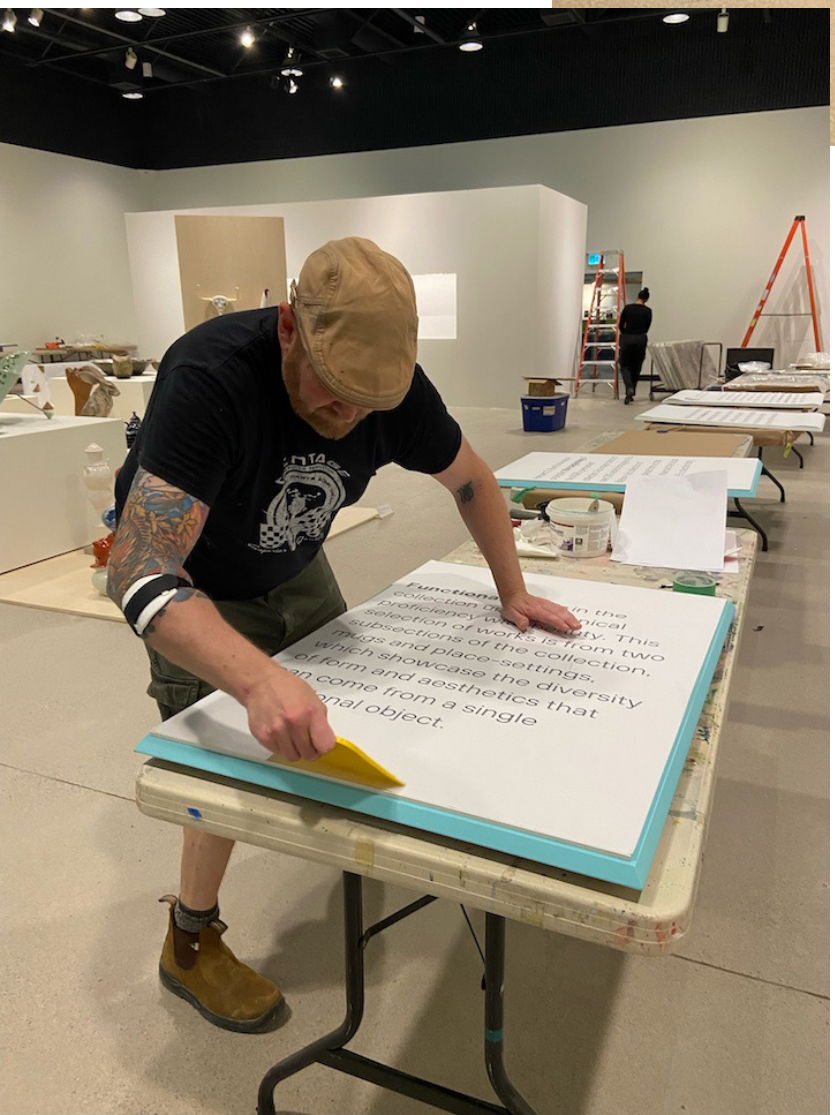


Image above: Wheat pasted wall at the Art Gallery of Burlington. *The Future of Work* exhibition design by LOKI, Art Gallery of Burlington, 2022. Recycled paper, wheat pasted exhibition entrance wallpaper.

Image below: Chris Blanchenot installing recycled paper wheat-pasted didactics on reclaimed MDF panels for *The Weight of Clay* exhibition at the Art Gallery of Burlington, 2023.

WHEATPASTING FOR GALLERIES

INSTRUCTIONS BY CHRIS BLANCHENOT, ART GALLERY OF BURLINGTON

Use 1 part flour to 4 parts water.

Push the flour through a fine sieve to help keep the solution as smooth as possible.

Mix in 1 part water to the 1 part flour to create a smooth slurry.

Boil water in a kettle and add another 3 parts water to the slurry mixing with a whisk.

“Whisk the daylights out of it” for a good 10 minutes, then every now and then as the solution cools over the next 20 min or so.

It will thicken as it cools. If you are going to keep a batch for a period of time, mix in a pinch of salt to help deter mold.

For cleanliness, mask out the space on the wall with painter’s tape (*note, because it often contains Polyacrylate adhesive, CSC recommends limiting the use of painter’s tape, but acknowledges there are few alternatives. Stay tuned for updates!)

Apply a thin layer of paste with a wide brush, keeping the layer thin and even.

Apply the sheet at one end and use a wallpaper squeegee to lay it down as flat as possible.

Place a sheet of clean paper over top and use a rubber brayer to roll out any air bubbles.

There are always tiny spots (bubbles), especially close to the edges, as well as small wrinkles in the paper, but both of these tighten up and disappear as the paste dries and the paper returns to its original sizing.

Wheatpaste cleans up easily and comes off the wall with a sponge and warm water when it is time to strike the show.

Larger posters can be applied in 2 parts. Paste the top half in place, then paste the bottom half and squeegee the whole deal as flat as possible.

The paste leaves the paper in a delicate state until it is dry, so it is very important not to overwork it as it will tear easily.

Requesting a slightly thicker paper from the printer for posters helped with this, but not too thick or the wheatpaste won’t stick (20lb and up).

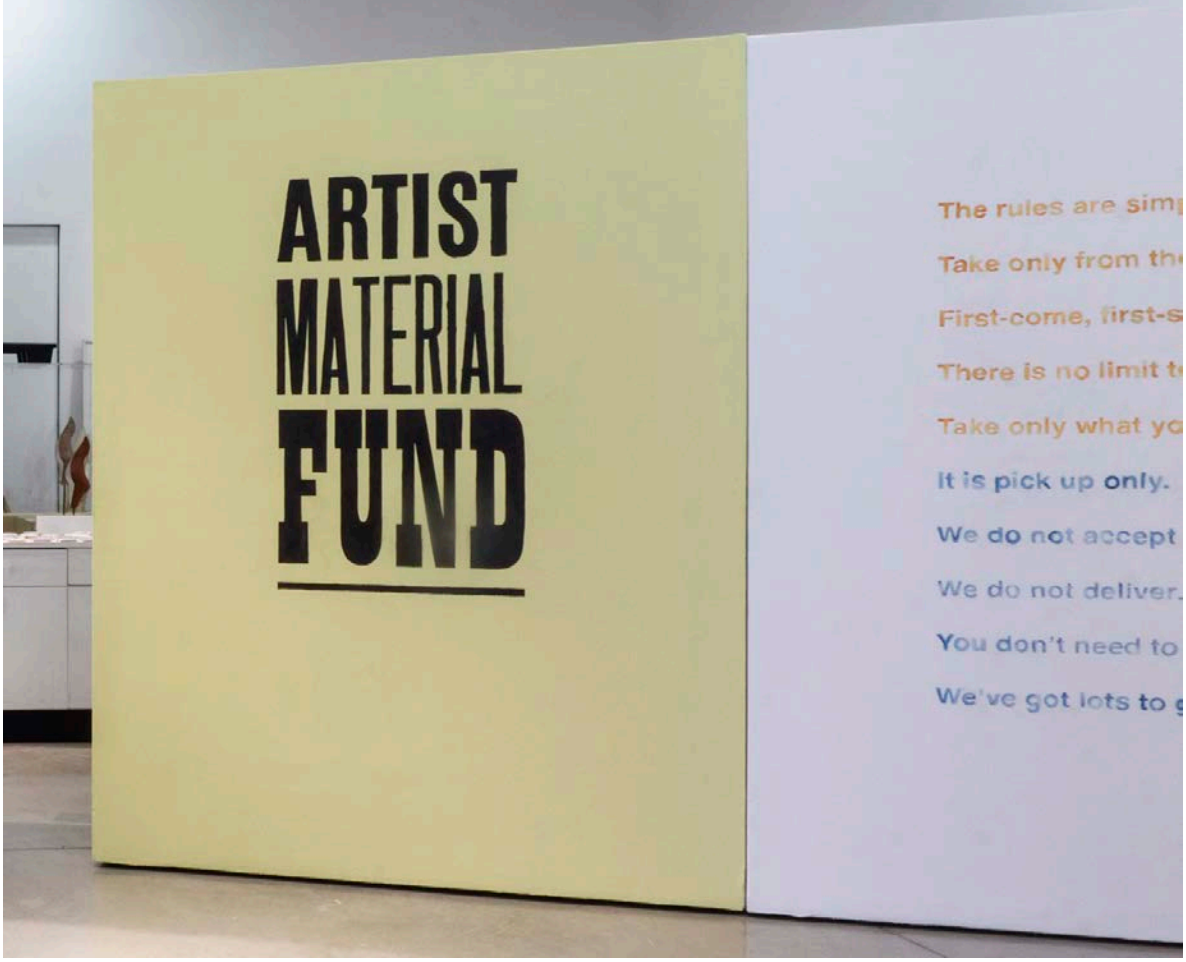
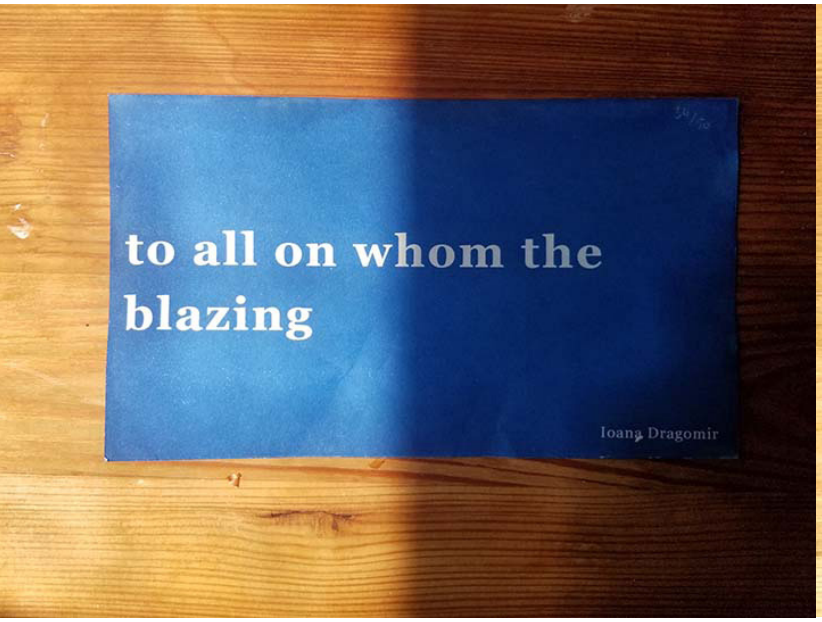
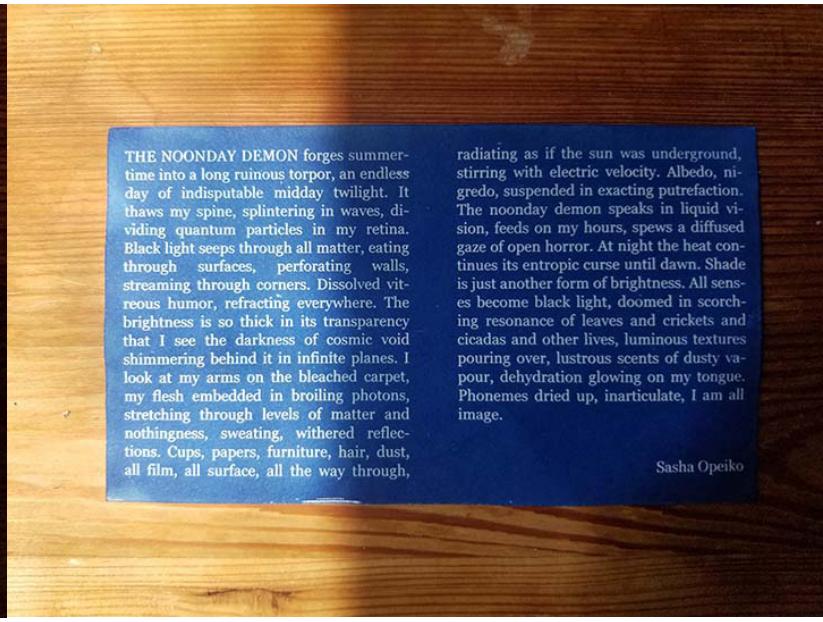


Image above: *Artist Material Fund* (Suzanne Carte), artLAB Gallery, Western University. The yellow wall was painted using Graphenstone ecological lime paint with graphene. The paint is breathable, avoids condensation, and absorbs CO2. The title was painted in plant-based acrylics (Beam Paints), and the orange and blue didactics are plastic-free watercolours (Beam Paints). The watercolour paints give varied tone, and can be washed off and then lightly sanded, as seen in the close up below from the exhibition *Curating Waste: Ist Das Kunst Oder Kan Das Weg?* (artLAB Gallery/Cohen Commons, 2023, curated by Friederike Landau-Donnelly and Kirsty Robertson), photo credits Dickson Bou.

Ioana Dragomir's graduating MA exhibition in Art History and Curatorial Studies (Western University) *to all on whom the blazing*, Satellite Project Space, London ON (2021), used wall text cut by hand from a found book on North American landscape paintings, coupled with cyanotype handouts. Cyanotypes use ferric ammonium citrate and potassium ferricyanide, which are typically considered to be less toxic than many photography chemicals, though they should still be used with care. Though not visible in these images, a title in the window, also cut from paper, was used to sun-bleach the shapes of the letters into the poster visible on the left of the image above. Image credit: Ioana Dragomir, 2021.



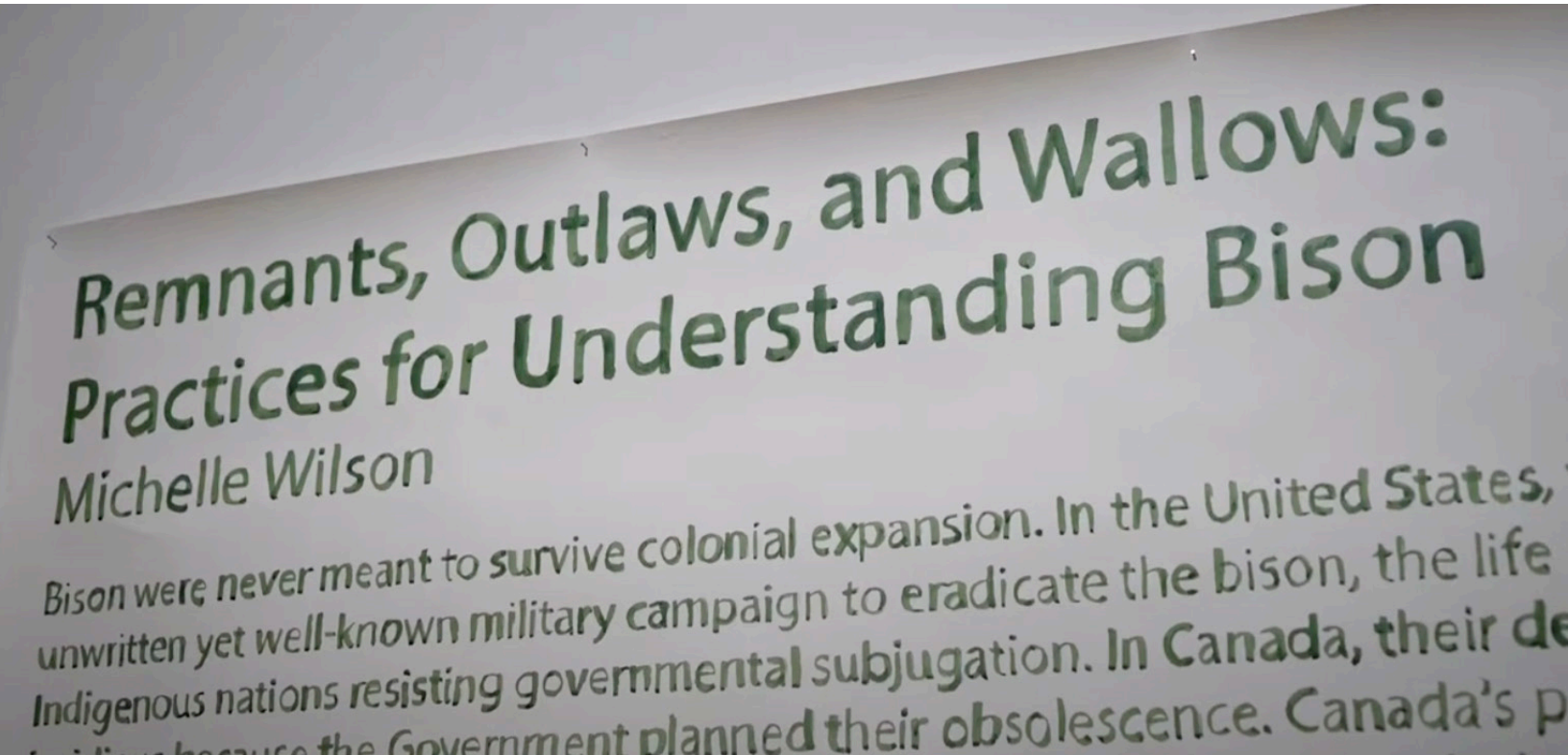


Above L top: Detail of the exhibition and artist name made with Nori paste and used coffee grounds. Photograph by Anahí González

Above L bottom: Detail of the Scotiabank Contact Photography Festival logo made with Nori paste and ground red chile Guajillo. Photograph by Anahí González

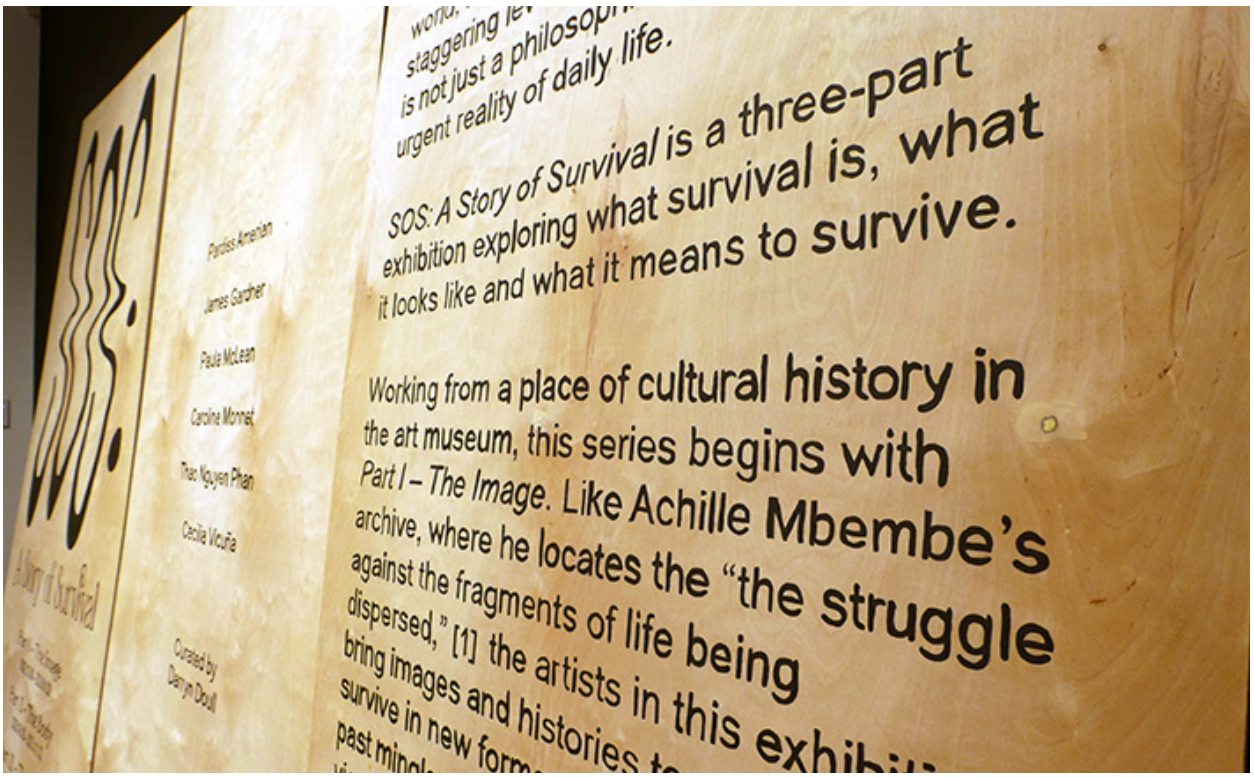
Above R: Didactic made with Nori paste, used coffee grounds, and ground red chile Guajillo for the exhibition *Hacia Arriba / Upwards* (2023) at Xpace, a core exhibition of the Scotiabank Contact Photography Festival. Photograph by Anahí González

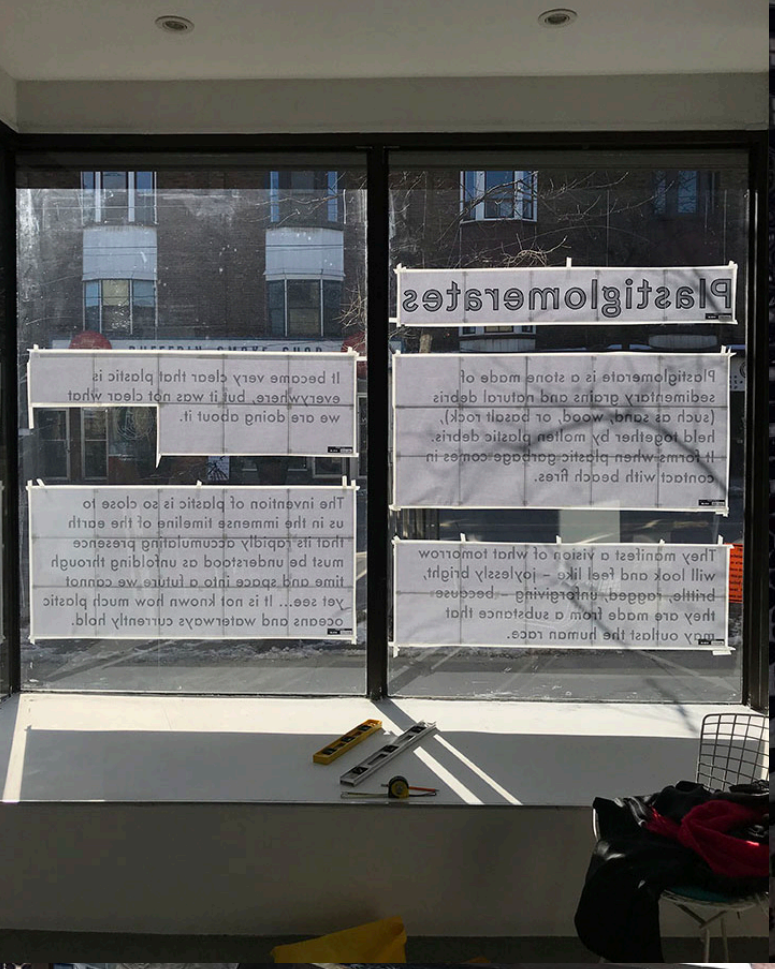
Below: Wall text from Michelle Wilson's exhibition *Remnants, Outlaws, and Wallows* at the McIntosh Gallery (2021). Photos courtesy of the artist. This didactic wall text was made using chlorophyll, which is a commercially available nutritional supplement that can be used as a cost-effective plant ink.



These panels are from *SOS: A Story of Survival, Part I – The Image* at the Kitchener-Waterloo Art Gallery (2022-23).

The didactic was a three-part panel design. Each panel is a 4 x 8 sheet of Birch plywood. The first panel has the exhibition title, second panel shows the artists' names, and third panel has the specific exhibition text. The lettering (and logos) were all hand-painted by curator Darryn Doull in paint leftover from the install. Exhibition-specific details are sanded off and replaced with the new copy for each part of the 3-part exhibition. At the end of the third part, the boards will be transferred to KWAG's materials inventory and used as the need arises. Photo courtesy of KWAG, by Toni Hafkenscheid.





Rachel Wallace and Petrina Ng (Durable Good) used Posca and Molotow water-based paint pens to write a passage on the window of Art Metropole in Toronto to accompany Kelly Jazvac's installation *Big Asks* and the launch of Durable Good's book *Plastiglomerates*. The text was meant to run in the rain, specifically to demonstrate its impermanence (unlike the lifespan of the vinyl used in Jazvac's installation and the plastiglomerate referenced in the window text). Images: Rachel Wallace, 2018.

Above: “Detail of chine collee/wall signage technique.” Presented by Virginie Fillion-Fecteau at the FOFA Gallery’s workshop “Replacing Vinyl Signage II: Experimenting with Painting and Drawing,” March 2023. Photo Credit: Laurence Poirier. This technique uses nori paste to transfer rice paper onto the wall. The CSC is partnering with FOFA in their creation of a toolkit for vinyl replacements that will include a detailed description of this technique (see the *Learn More* section of the Guide for more detail).

Below: Jess Slipp, *with & of (Becoming rock)*, 2023. Detail of wall signage at FOFA Gallery. Photo Credit: Alexis Bellavance. This fully biodegradable wall signage was made using two ingredients: rice paste and sandstone collected from the Minas Basin, Nova Scotia.

KI CULTURE'S HIERARCHY of WASTE MANAGEMENT

REFUSE

Don't use toxic materials. Refuse to buy new materials. Refuse to use materials that do not biodegrade or do not break down over time.

REDUCE

Buy and use fewer materials. Reduce carbon footprints. Question consumption.

REUSE

Reuse materials. Share materials. Build new exhibitions and artworks from old ones.

REPURPOSE

Recycle laterally by giving old materials a new purpose. If something is broken can it be used for something else?

RECYCLE

Recycling should be a last, rather than a first, response. Recycling is often not good for the environment. It can produce toxic waste and paradoxically, access to recycling often leads to MORE consumption.

RESOURCES

THIS IS A LIVING DOCUMENT AND WILL BE UPDATED FREQUENTLY. URLS ARE CHECKED AND UPDATED ANNUALLY. ACTIVE LINKS MAY NOT WORK WITH A VPN.

WE DO NOT RECEIVE MONEY FROM ANY OF THESE COMPANIES. IN ALL CASES, THE CSC DECIDES THE THRESHOLD FOR INCLUSION. PLEASE CONTACT US AT SUSTAINABLE.CURATING@UWO.CA IF YOU THINK SOMETHING SHOULD OR SHOULD NOT BE INCLUDED.

REUSABLE ITEMS

THAT CAN BE BORROWED FROM THE CENTER FOR SUSTAINABLE CURATING:

THINGS THAT NEED TO BE RETURNED:

Solar charger

Picture frames (light oak):
5x7 (4)
8 x 10 (4)
8.5 x 11 (4)
12 x 16 (4)
16 x 20 (4)
18 x 24 (4)
19.75 x 27.5 (4)
12 x 17 silver (4)
21 x 27 gold (1)

Frame Mats

Two 32 x 48in light boxes

Lettering stencils in multiple sizes

ART SUPPLIES THAT DO NOT NEED TO BE RETURNED:

Interior wall paints, watercolours, paintbrushes, scrap paper, scrap wallpaper, maps, newspapers, glue, fabrics (including large amounts of blue felt), thread, yarn, knitting needles, tape, scissors, cellophane, fun fur, stickers, brushes

REUSABLE ITEMS

THAT CAN BE BORROWED FROM OTHER LOCATIONS ON CAMPUS:

VISUAL ARTS SIGN OUT OFFICE:

Students in the Faculty of Arts and Humanities can borrow a wide range of audio, visual, and media equipment from the Sign Out office.

See an up-to-date list and make reservations here:

Link to Arts and Humanities Sign Out

Instructional and educational videos for using equipment and learning about art are available.

WELDON LIBRARY

The libraries at Western loan equipment as well as books, including adaptors, chargers, headphones, calculators, safety goggles, and interactive pens:

Link to Weldon Library loanable equipment

DEPARTMENT OF TECHNICAL SERVICES:

Students in Visual Arts can borrow equipment and films from the Richard & Beryl Ivey Visual Arts Digital Resource Centre:

Link to VA Sign Out

REUSABLE ITEMS

THAT CAN BE BORROWED FROM OTHER LOCATIONS ON CAMPUS:

ARTLAB:

If you are installing an exhibition in the Artlab or Cohen Commons, Artlab has some media, paint, tools, and installation materials for re-use. Artlab also has some disposable dishes left over from past exhibitions, a velvet curtain, and two display tables in addition to plinths and moveable walls.

WESTERN FURNITURE DEPOT

An annual free furniture exchange, usually held outside, near Richmond Gates, in late April-early May.

OTHER RESOURCES:

Sustainability Western has lots of tips, resources and funding opportunities:
Link to Sustainability Western

Western Active Transportation Society advocates for cycling and walking at Western:
Link to WATS

The Centre for Environment and Sustainability offers courses, modules, and graduate programs dedicated to sustainability:
Link to CfE&S

SUSTAINABLE RESOURCES

PRINTERS

Navigating sustainable printing is difficult as there is a lot of greenwashing and misinformation. Large-format printing is particularly difficult to find. For this reason, some of these businesses are not in London, but will mail finished work.

ACCELL
657 Wilton Grove Rd
London, Ontario
Link to website

- zero toxic waste from the plate making process
- 99% recycling
- renewable power sources to run establishment
- FSC approved paper (unknown if they can print large-scale)

WATT SOLUTIONS INC
40 Micro Court,
London, Ontario
Link to website

- tree farm rather than old growth paper
- chemicals and solvents that are almost 100% water soluble, bio-degradable, and recyclable

MINUTEMEN PRINT
100 Bessemer Rd Unit 7
London, Ontario
Link to website

- all paper stock is FSC certified (60-80% post-consumer) with the option of bringing in paper that is 100% post-consumer
- can print books on recycled paper with no minimum order. Most sustainable binding option is saddle-stitch
- large format printing available on recycled paper
- printing is toner-based, not ink based. Toner process is 95% efficient and the waste gets sent back to the manufacturers to be re-incorporated instead of sending to landfill
- rigorous recycling on the back-end
- free local delivery

A&B PRINT
45 Meg Drive Unit 104
London, Ontario
519 685-0321
am@anbprint.com
Link to website

- FSC certified paper
- vegetable-based inks for off-set and large format printing
- post-consumer supplies

WARREN'S WATERLESS PRINTING
Toronto, Ontario
416-745-8200
info@warrenswaterless.com
Link to website

- recycled paper, eco-inks
- waterless printers
- Bullfrog powered

COLOUR INNOVATIONS
161 Norfinch Dr
Toronto ON
416-663-6703
questions@colourinnovations.com
Link to website

- low VOC
- partially powered by Bullfrog Power

NEW PRINT
25-2450 Lancaster Road
Ottawa
613-738-0531
support@newprint.ca
Link to website

- printing on FSC papers and 100% post-consumer papers
- large-scale printing (up to 24" x 36") on post-consumer paper
- vegetable-based inks
- books/catalogues printed with vegetable-based ink only if quantity is over 500. If under, they will be printed digitally which uses toner instead.

ENUIRO DIGITAL PRINTING
91B Caroline St. South
Waterloo, ON N2L 1X4
519 885 2333
edp@edprinting.com
LInk to website

The CSC recommends risograph printing as an eco-conscious choice for multi colour duplicate printing up to 11x17. Risograph printing works like screenprinting and usually involves minimums, so it's fantastic for handouts, booklets, and posters.

VIDE PRESS
101 Sheridan Ave
Toronto, Ontario
info@videpress.ca
Link to website

HIDDEN QUALITY PRINTING
Hamilton, Ontario
hello@hiddenquality.ca
Link to website

COLOUR CODE PRINTING
Toronto, Ontario
Hamilton, Ontario
info@colourcodeprinting.com
Link to website

SUSTAINABLE RESOURCES

PRINTERS/OTHER

PDF COMPRESSOR
Link to website

- makes digital files smaller for a lower carbon footprint

REZONANCE PRINTING (SCREEN PRINTING)
629 Dundas St E.
London, Ontario
Link to website

- Indigenous-run
- internships for local Indigenous artists
- screen printing on posters, clothing, bags
- all products are eco-friendly with the exception of plastic-based ink. A water-based ink is also available.

ECO FONT
Link to website

- converts font to a version that is more efficient to print
- uses 50% less ink than printing raw document
- usually undetectable difference

In general, fonts that have less "weight" are more eco-friendly when it comes to printing due to the amount of ink needed to print each letter.

Century Gothic *is an efficient font in that it is light, but it uses a lot of space (hence more paper for printing).*
Times New Roman *and* Garamond *are both light and narrow.*
Arial *is a heavy font and can use up to 30% more ink than lighter fonts. We used* Open Sans *in this guide.*

RENEWABLE ENERGY WEBHOSTING

WEB HOSTING CANADA
Link to website

- web hosting powered with renewable energy
- no fossil fuels
- they use solid state drives which are more energy efficient than traditional servers
- green cooling methods for servers
- can host Wordpress, and provide a drag and drop site builder

GREEN GEEKS
Link to website

- working to offset carbon usage by putting renewable energy back into the grid.

ETHICAL HOST
Link to website

- they reduce their own emissions with a combo of green energy and offsets
- uses solid state drives
- free DIY site builder available

HOME BREW SERVER
Link to website

- specifics for low-energy web design

SOLAR WEB HOST
Link to website

LOW-TECH MAGAZINE
Link to website

- guide for low energy websites, along with source code from their own site.
- instructions on how to build solar websites.
- info about the sustainability specifics of solar websites.

SOLAR PROTOCOL
Link to website

- a DIY web platform powered by a network of solar panels and small batteries.

SOLAR-POWERED MEDIA
Link to website

- guide for building a solar-powered media storage and sharing server.

LOW CARBON RESEARCH
For more information see Dr. Anne Pasek's research at:
Link to website

WEBSITE CARBON CALCULATOR
Link to website

- gives estimates for the carbon footprint of websites.

BLACKFLASH
Link to webpage

- Christina Battle documents how she reduced the carbon footprint of her website(s).

SUSTAINABLE RESOURCES
COMPOSTING, RE-USE, AND RECYCLING

Composting and Food Waste

URBAN ROOTS COMPOSTING PROGRAM
21 Norlan Ave
London Ontario
Link to website

- accepts compost donations
- possible to donate post-event food waste

THE WORMERY
Western Fair District
London, Ontario
Link to website

- workshops on vermiculture

Resource Sharing and Re-use

HOME DEPOT
multiple locations

- tool rental program

Re-use: frames, books, lighting, furniture, kitchenware, paint, tarpaulins, countertops, tools, used sheets for dustcovers and dropcloths etc.

GOODWILL
Many locations:
255 Horton St E.
3410 White Oak Rd
1225 Wonderland Rd N.
1165 Oxford St E.
For other locations:
Link to website

FOREST CITY SURPLUS
519 451 0246
Link to website

LIFESPIN FREESTORE
866A Dundas St
Link to website

- online registration required

RESTORE
611 Wonderland Rd N.
5-40 Pacific Court
317 Adelaide St
519 659 1949
Link to website

VALUE VILLAGE
4465 Wellington Rd S.
1553 Dundas St
30 Oxford St W
London, Ontario

GOOD VALUE
140 Dundas St
London, Ontario
226-777-7596

MISSION STORE
797 York St
London, Ontario
519-439-3056

The CSC recommends reducing and reusing where possible. Recycling should be a last choice. It has also been demonstrated that many programs designed to recycle "non-recyleable" materials may be counterproductive. Proceed with caution.

WESTERN RECYCLING PORTAL
1151 Richmond St
London ON
sustainability@uwo.ca
Link to website

- Western has a recycling portal for things like lightbulbs, toner cartridge, hazardous waste, repurposing wood/furniture

GREEN VALLEY RECYCLING
1200 Green Valley Road
London, Ontario, N6N 1E3
519 681 0606
info@greenvalleyrecycling.ca
Link to website

- local recycling program for construction waste including drywall
- electronic recycling (free)
- non-hazardous waste recycling

TERRACYCLE
Link to website

- provides services for recycling things that are otherwise not recyclable (office supplies, cleaning supplies, plastic gloves, lightbulbs, e-waste).

TRY RECYCLING
3544 Dingman Drive
21463 Clark Rd
London, Ontario N6E 3X1
Link to website

- there is a charge for dropoff
- accepted materials include construction debris including lumber and drywall, freon units, metal, and electronics

ENVIRO DEPOT
1450 Oxford St W.
28 Clarke Rd

Ask around. There are many manufacturers in London, and some of them are happy to give away offcuts, waste, and other materials that would otherwise go to the landfill. Let us know who has helped you out - we'll add them to our resources file.

SUSTAINABLE RESOURCES

MATERIALS - NEW - LUMBER

SOURCING CLIMATE-SMART WOOD
Link to website

- a useful resource for understanding the complexicities of sustainable lumber.

As with many materials, sourcing "green" lumber is tricky. Reclaimed and reused is best. If using reclaimed wood is impossible, it's best to look for FSC Certification. Cross-laminated and engineered timbers are often recommended for large building projects, but significant questions are being raised about the long-term environmental impacts of these new materials.

COMMONWEALTH PLYWOOD CO
1010 Green Valley Rd
London (currently closed due to tornado damage; products are shipped from Waterloo)
519-681-5304
webmaster@commonwealth-plywood.com
Link to website

- FSC Certification
- avoid acrylic and laminate coatings when choosing wood.

HOME DEPOT
multiple locations in London
Link to website

- look for PureBond formaldehyde-free plywood

CANADIAN SALVAGED TIMBER
442 Dufferin St Unit J
Toronto ON
info@cstimber.ca
Link to website

- reclaimed wood
- sourced from Southern Ontario
- also sells natural, low VOC wood finishes

TIMELESS MATERIAL CO
305 Northfield Dr E
Waterloo ON
519-883-8683
info@timelessmaterials.com
Link to website

- reclaimed wood, barnboard, flooring, timber

DEMOLITION
For the past several years, Museum of Vancouver has been working with local demolition companies to repurpose materials (drywall, lumber etc.) for exhibition infrastructure. Their recent exhibition Reclaim and Repair used vintage mahogany (an endangered wood) that had been harvested in Guatemala and Nicaragua in the 1950-70s and was later donated to MOV. The museum worked with local designers to repurpose the lumber, with a percentage of sales donated to Indigenous-led reforestation efforts in Nicaragua and Guatemala. Would something similar be possible in London?
Link to website

PAINT

Wall paint for gallery installation, moveable walls and large surfaces

GRAPHENSTONE
- mineral-based paints that absorb CO^2
- available at RONA and Lowes
Link to website

HOME DEPOT
multiple locations in London

- off-tint cans of paint (rejects)
- low and zero VOC paint (BEHR Premium line; look for the Ecologo)

MILK PAINT
available at Lee Valley
Link to website

- 100% organic, biodegradable paint
- 0 VOC, non-toxic
- based on a milk protein
- good for painting plinths, shelves, lettering on walls, but not entire walls

You can also make your own milk paint - there are many recipes online.

BOOMERANG PAINT
available at RONA
820 Blythwood Road
London, Ontario
Link to website

SUSTAINABLE RESOURCES
PAINT CON'T

- recycled interior paint
- low VOC

RONA
ECO RECYLED INTERIOR PAINT
Link to website

- recycled from unused paint
- limited range of premixed colours
- low VOC

CHALK PAINT
available in multiple locations in London

- water-based paint
- very low VOC
- non-toxic
- unlike Milk Paint it is not completely organic and has acrylic binder

BIOSHIELD PAINT
Note - there is currently no Canadian dealer

Link to website

- clay paint that is non-toxic, no-VOC
- ingredients are water, clay, chalk, alcohol, cellulose, pigments, and preservatives
- no plastics
- also sell organic wood stains/ finishes, and household cleaners

LOOP PAINT
available at Giant Tiger locations
Link to website

- recycled paint
- low VOC
- free paint for non-profits

Pigments for painting (i.e. canvasses)

Natural pigments do not have plastics in them. They are typically made from mica and minerals, usually collected in France. Users will need to weigh the carbon cost of shipping vs. the fact that they are natural. Natural pigments are not renewable - they are made from geological deposits that take millions of years to form. A binder (like milk paint) is required for natural pigments.

EARTH PIGMENTS
Link to website

- the company has a small carbon footprint
- represents the Societes de Ocres de France in the United States

NATURAL EARTH PIGMENTS
Link to website

- based in Oregon but with a Canadian website
- their installations use solar power
- they use recycled, biodegradable and locally produced packaging
- the company has a strong ecological ethos

KAMA PIGMENTS
Link to website

- a smaller selection of colours than Earth Pigments or Natural Earth Pigments, but the company is based in Quebec and some pigments are collected nearby, meaning a lower carbon footprint fom shipping.

Watercolours and inks

BEAM PAINTS
info@beampaints.com
Link to website

- Indigenous-owned company
- beautiful watercolour paints, acrylics, inks made from lightfast pigments, tree sap, gum arabic, and Manitoulin honey
- paints are wrapped in beeswax
- paint pans are made from cedar and birch offcuts from an Indigenous sustainable lumber operation
- some other supplies (paint brushes, mixing trays etc. are also available)

TORONTO INK COMPANY
Link to website

- street foraged inks
- custom colours available

You can also make your own ink from local supplies. Black walnut, black raspberry, sumac, and coffee grounds can all be used to make ink. There are lots of recipes online (but please forage responsibly).

SUSTAINABLE RESOURCES
ADHESIVES, PLASTER ETC.

Many glues and adhesives contain formaldehyde and phthalates. Formaldehydes are known to be toxic and according to the World Health Organization they are carcinogenic to humans. Phthalates are plasticizers that add durability and flexibility to adhesives. Phthalates are "forever chemicals."

Sustainable and eco-friendly adhesives are difficult to find, and particularly so in London and the surrounding region. The CSC is still researching alternatives. Most of the suggested resources are "better" rather than truly eco-friendly options.

LEE VALLEY
2100 Oxford St E,
Link to website

- high tack fish glue.
- sandable, resists solvents
- biodegradable
- does not require acetone for cleanup
- note: fish glue has low water resistance. This can be extremely useful as it means that work can be undone. However, it may not be appropriate for all projects.
- not vegan
- Lee Valley notes this product is made in Canada, but there is no information on what kind of fish are used or if the fishery is sustainable. It is recommended that sturgeon glue be avoided as sturgeon are endangered.

FUNORI GLUE and NORI PASTE
Derived from seaweed and/ or starch, this Japanese glue is extremely useful in gallery and museum installation. It can be used in different consistencies to apply paper and labels to walls, and is extremely easy to clean up (using only water), and biodegradable.

Funori glue is already used in many art conservation applications.

At present, there is no Canadian source for making funori glue, but it can be ordered from many stores.

The CSC has Nori paste that can be used by students.

Link to website

WHEATPASTE
A mixture of flour and water and a pinch of salt, wheatpasting can be used to install labels, didactics, and wallpaper backdrops. It can take a bit of practice for smooth installation, but wheatpaste is cheap, effective, easy to clean up, and highly sustainable.

See the wheatpasting recipe and instructions on page 17.

ECO BUILDING RESOURCE
Link to website

Located in Aurora Ontario, Eco Building Resource has many options for eco-friendlier adhesives, as well as for stains, paints, sealants, and insulation. In many cases, they are the only Canadian dealer for certain products. Highly rated eco-friendly adhesives include:

- Safecoat 3-in-1 adhesive, which is designed for hard composition walls, floor tiles, and carpeting. It is solvent-free, odorless, and does not off-gas, with very low VOC content. It is similar to an epoxy or polyurethane adhesive.
- DuraPro Woodworkers Glue. CSC recommends using fish glue if possible, but this product is an alphatic resin adhesive that can be used where fish glue cannot.

LEED CERTIFIED
Many companies advertise "green" adhesives, but they are often chemically dense, and the full life-cycle of the product is not taken into account.

LEED certification can be helpful. Buildings that have achieved LEED Gold and LEED Platinum certification often require products that have had their life-cycles critically assessed. Often building projects include carefully assembled lists of products, including Technical Specifications. Paints, adhesives, and sealants are typically included.

STiCH
See the *Learn More* section for STiCH - this database will allow you to compare different glues.
Link to website

SUSTAINABLE RESOURCES
TEXTILES AND DYES

LENS MILLS
360 Exeter Rd
Building 2, London ON
Link to website

- sells fabric offcuts, including scrap vinyl, upholstery fabric, cottons, poly-leather
- although these fabrics are not sustainable materials, buying offcuts is better than buying them from scratch/off the roll
- textiles for reusable (not plastic) dustcovers in sustainable fabrics like Tencel or linen

To the best of our knowledge there is no specific dealer of sustainable textiles in the London-region.

ECO STYLIST
Here is a very useful guide on the most and least environmentally sustainable textiles:

Link to website

RIVERSIDE TEXTILES
1007 Gerrard St E.
Toronto, Ontario
info@riversidetextiles.ca
Link to website

- Hemp, TENCEL, linen fabrics available

EARTH INDIGO
4279 Elgin Mills Rd E
Markham ON
info@earthindigo.com
Link to website

- natural fibres
- Tencel, linen
- organic cotton, lenzing certified, Oeko-Tex certified

CANADIAN TEXTILE RECYCLING LTD
5385 Munro Court
Burlington ON
Link to website

- bundles of used textiles
- supply to companies that use them for industrial cleaning

AJAX TEXTILES
170 Commercial Dr
Ajax ON
Link to website

- Global Organic Textile Standard certified
- certification addresses source material plus processing methods

SIMPLIFI TEXTILES
Link to website

- online only
- family-owned
- they only work with textile companies that are certified organic, and they are very up to date on what organic certification actually means
- some of their textiles have travelled a long way - remember to weigh the carbon footprint of travel against organic when making choices.

FABCYCLE
This is Vancouver-based and included here only for information as we would love to see something like this in Southwestern Ontario.
Link to website

- collection service for textile waste
- TexTile re-use centre for artists and sewers.

THE COLOUR FARM
560 Terrace Road
Callander ON
hello@thecolourfarm.ca
Link to website

- natural, plant-based dyes
- grown and sold in Ontario
- farm also supports an apiary

G&S DYES
250 Dundas St W, Unit 8
Toronto ON
sales@gsdye.com
Link to website

- natural dyes; mostly plant-based although some are insect
- plant-based fabrics

MAIWA NATURAL DYES
Link to website

This Vancouver-based company sells natural-based dyes such as cochineal (not vegan), brazilwood, local plants, and also carries resources on how to forage (responsibly) to create your own dyes from local materials. They also offer free tutorials on their teaching platform.

SUSTAINABLE RESOURCES

ART SUPPLIES

Keep an eye out for CSC-hosted art supply exchanges!

BEAM PAINTS
info@beampaints.com
Link to website

- Indigenous-owned company
- beautiful watercolour paints and inks made from lightfast pigments, tree sap, gum arabic, and Manitoulin honey
- paints are wrapped in beeswax
- paint pans are made from cedar and birch offcuts from an Indigenous sustainable lumber operation
- some other supplies (paint brushes, mixing trays etc. are also available)

BIJAN'S ART STUDIO
673 Richmond St
London ON
Link to website

- Strathmore recycled paper (400 series)
Link to website
- sand erasers
Link to website
- FSC certified pastel paper
Link to website

CURRY'S ARTIST MATERIALS
820 Wharncliffe Rd S.
London, Ontario
Link to website

- a variety of recycled paper and sketchbooks
- Tri-Art re-harvested mediums "use re-harvested particles from other manufacturing processes to create beautiful, texture mediums."
Link to website

DESERRES
Multiple locations in Toronto
Link to website

- recycling program for things like paint tubes, markers, brushes (drop-off in store)
- collection of environmentally responsible products, identifiable by eco-logo

DIY
Below we've included a link to a list of eco-friendly art supplies, but we also encourage DIY art supplies. There are many resources online. Before buying, can you make it yourself? See the *Student Project* and *Learn More* sections for examples.

Link to a booklist
Link to web resource

SHARED RESOURCES + FILM

LONDON COMMUNITY WORKSHOP
195 Horton St East
London ON
info@londonwoodshop.ca
Link to website

- woodshop
- locally-sourced wood available on site or to order through local distributers
- monthly or yearly memberships

LONDON THING LIBRARY
Once you have a membership, you can have access to up to 500 tools and household equipment. There is a monthly membership fee.
Link to website

- Food Processing Tools
- Garden Tools
- Hand Tools
- Building Tools
- Household items, such as door gear and arts and crafts equipment
- Low waste community event items such as cutlery, serving plates and coffee makers. outdoor gear and arts and crafts equipment

BULK BARN and ***REIMAGINE*** (multiple locations and 206 Picadilly St) encourage you to bring your own containers for no-waste exhibition opening treats and installation fuel.

The CSC has some reusable dishes that can be borrowed.

CAFFENOL LAB
Link to website

Caffenol Lab in Brantford will develop black and white film using environmentally friendly processes. They also sell Cawanol, their in-house film developer, which uses coffee and other eco-friendly ingredients.

SUSTAINABLE RESOURCES

MATERIALS - NEW - FRAMES

Currently, to our knowledge, there are no framers in London using FSC certified woods. We would be happy to update this section. Please note that the CSC does have a limited number of frames that can be borrowed.

SUPERFRAME
100 Geary Ave, Toronto
416-913-7590
sales@superframe.ca
Link to website

- Frames made from sustainably harvested North American hardwood
- they can also source FSC (Forest Stewardship Council)-certified wood
- finishes are low VOC and water-based
- wood offcuts are used by pizza restaurants to burn in their ovens; foamcore and matboard offcuts are given to schools and art programs

THE ART STORE
91 Caroline St
Waterloo ON
519-744-1103
theartstoreofwaterloo@bellnet.ca
Link to website

- carry a line of mouldings made from FSC certified wood

CUSTOM ART CONCEPTS
101 - 507 King Street E.,
Toronto
416-861-0544
info@customartconcepts.com
Link to website

- the only FSC certified framing store
- all packaging and paper are recycled
- wood is FSC certified

DESERRES
multiple locations in Toronto and Oakville and online
Link to website

- FSC certified mouldings are available (requires a search through the web page)

DIDACTICS AND SIGNAGE

Alternatives to vinyl lettering and labels in museums are a topic of current study at the CSC. Check in frequently for updates and see pages 11-24 of the Resource Guide for more information.

TORONTO SIGN PAINTING
Toronto-based but will travel to London
Link to website

- a pricey but stunning alternative to vinyl lettering

PVC and solvent-free vinyl is very difficult to find, and is still ecologically questionable. The CSC suggests avoiding if possible, but has included one source.

ECO-FRIENDLY CRAFT VINYL
Suwanne, GA
Link to website

- green certified
- phthalate free
- PVC-free
- solvent free adhesive
- recyclable
- it's still plastic and derived from petroleum products, with an extensive lifespan. Use with awareness of its impact.

LETTERING STENCILS

Available in multiple locations, including the CSC. If the CSC does not have the sizes you need, we suggest Above Ground Art Supplies' cardboard lettering stencils.

Link to website

The vinyl cutter in the Visual Arts Department can also cut paper stencils.

The CSC encourages experimentation with signage, and has tried Beam paints and ink, black walnut ink, fabric and stencils, light and contruction paper, cut letters from old posters and wall paper, chlorophyll ink, digital signage, and cyanotype. We would love to hear about your experiments!

SUSTAINABLE RESOURCES

CLEANING SUPPLIES

REIMAGINE CO
Link to website

- cleaning supplies with zero waste packaging
- vinegar for cleaning
- all products are plant-based
- laundry detergent for washing gloves, blankets, etc

RE-USABLE GLOVES

- cotton gloves as an alternative to disposable plastic gloves

- Tencel is also a good sustainable material (plant-based and less water-intensive than cotton; less chemically intensive than bamboo)

- cotton and tencel gloves are available at many locations. They are often marketed as "eczema gloves".

- Lee Valley sells tencel gloves as liners.
Link to website

IONIZED WATER

Link to web resource

- ionized water is used by institutions like the Field Museum in Chicago to clean display glass, since it's a cleaner that is non-toxic, not heavily processed, etc.

- it seems very counterintuitive to recommend it since it's a bottled product that the zero-waste stores don't have, but it can be purchased in a refillable tank and decanted into reusable spray bottles.

JOANNE GREEN
CSC highly recommends this video on how to dispose of acrylic paint without releasing microplastics:
Link to web resource

NATURAL PAINT REMOVERS
This resource includes information on numerous natural paint removers including information on how to remove paint from various surfaces (plastic, metal, wood etc.)
Link to web resource

MISCELLANEOUS

LONDON ENVIRONMENTAL NETWORK
Link to website

- offers resources for running events to its members (plastic-free water stations, tents, tables, reusable cutlery and plates)
- info is also available on running green events.

If an event is longer than one day and registered with London Tourism, it may be eligible for an LTC Convention Pass which provides free bus transit

LONDON ENVIRONMENTAL ACTION INCUBATOR
Link to website

- $1000 grants available for orgs trying to reduce emissions, reduce waste, and enhance waterways

SUSTAINABILITY AT WESTERN
Link to website

Lots of resources here for on campus initiatives

ROOTREE
1-5295 John Lucas Drive
Burlington, ON L7L 6A8
info@rootree.ca
Link to website

- compostable and recyclable packaging

SKIM MILK
Skim milk in a spray bottle can be used for a number of short-term applications. Milk can be used to glue paper onto glass. It can also be used to seal plaster. Be careful to use non-fat milk. When it dries, any fat in the milk will separate from the plaster and crumble.

SUSTAINABLE RESOURCES
PACKAGING AND SHIPPING

There are boxes and packing materials available at the CSC. Facebook marketplace and kijiji are also good places for finding used materials.

BEST BOX
Forest City Storage
277 Maitland Street
London Ontario
Link to website

- used boxes sold for $2.99
- multiple locations in London

UHAUL
112 Clarke Rd
London ON
Link to website

- reusable plastic bins for rent
- biodegradable packing peanuts (starch)

MISCELLANEOUS
Most shipping companies in London stock biodegradable packing options. These include:

Starch peanuts
Starch foam
Cellulose packaging

Biodegradable means materials that can be broken down by microbes and bacteria and assimilated into a natural environment. Biodegradation is typically a natural process, but many products that claim to be biodegradable actually require very specific conditions to break down.

Compostable refers to a product or material that can biodegrade under specific, human-driven circumstances. Intervention is required for the product to break down. Very often products that are marketed as compostable will not compost in back yard composters or in landfills and require very specific and often energy-intensive intervention to breakdown.

For this reason, CSC recommends re-using packing materials as much as possible before purchasing new (even new biodegrable materials).

MUSHROOM PACKAGING
not available in Canada except as a start up. we have included it for interest

Link to website

Link to website

- mycelium packaging made from mushrooms
- totally biodegradable

CONTAINER EXCHANGE
Link to website

- variety of used containers available locally
- can search by type and location
- includes wood crates, plastic bins, metal boxes, etc
- kijiji is also a good option for this, along with facebook marketplace, and buy nothing groups

PAPER PACKING TAPE
- This kind of tape can be removed without damaging boxes, written on, and recycled.
- the adhesive is natural
- it is available at multiple locations in London:
Link to website

TURTLEBOX
no fixed Canadian location – ships through fine art shippers
info@turtlenorthamerica.com
Link to website

- re-usable crates for shipping artwork
- flexible design makes it possible to pack and secure multiple works in a single crate
- available from Toronto through art-shippers, but they can also ship to other parts of Ontario
- rentals are very pricey, but they are used by major institutions and might be a good resource when transporting borrowed work from institutions

VIRTUAL COURRIERS
Developed by Ki Culture and Tate Gallery, here is a guide for couriering things virtually rather than sending a person with the work. This is likely not something most student curators will be doing but might provide helpful guidelines for how to navigate shipping work while minimizing non-essential travel.
Link to website

BARDER
Though there are currently few options in SW Ontario, Barder is a resource sharing website for the arts, including crates etc. Lots of possibilities for expansion into our region!
Link to website

SUSTAINABLE RESOURCES

TRANSPORTATION

London lacks many eco-options like bike courriers, easy cargo bike rentals, electric car rentals, and so on. Many of the options included here are nascent or only periodically available. Hopefully over time, the call for more ecological solutions will lead to more options.

LONDON CYCLE LINK
London Cycle Link doesn't rent bicycles or cargo bicycles, but they advocate on behalf of cyclists in London. If you think cargo bike rentals are a good idea, London Cycle Link might be able to help make that happen.
Link to website

BIKE WINDSOR ESSEX
Windsor, Ontario
Link to website

This is not in London, but is a good example of what could happen here.
- electric cargo bike rentals for transporting art, supplies, and other items
- approximately $100 per day for an e-cargo bike

PUROLATOR
1070 Wellington Rd
London ON
Link to website

- offers FSC certified packaging
- they have electric vehicle fleets in Toronto, Vancouver and Montreal but not London
- if you ship using Purolator in London, please request this service for the future:
Link to website

ENTERPRISE
288 Horton St
1652 Dundas St
London, Ontario
Link to website

- electric and hybrid vehicles available for rent (select from "Vehicle Class" dropdown menu)

- multiple locations in different cities; can do pickup in one city and drop-off in another to save making round-trips (sometimes this costs more, check first)

COMMUNAUTO
no actual location; use the app to find cars in your area

available in Ottawa, Kingston, Kitchener-Waterloo, Cambridge, Hamilton, London, Guelph, Toronto
Link to website

- car sharing program (downside: there is a monthly fee, so it might not be a good choice for individuals)
-electric and hybrid vehicles available,

LIGHTING

In almost all cases, LED lights are much more efficient than incandescent or fluorescent bulbs.

LED lights are typically brighter than incandescent lights and frequently use up to 75% less energy than incandescanet and also have significantly longer life-spans.

The artLAB recently installed new LED lighting.

Various forms of lighting are also available at the sign out office.

The CSC's solar charger is available to power installations.

New LED lights can be purchased at many locations in London, and it is worthwhile choosing brands that use less packaging.

And of course: don't forget to turn the lights off!

SUSTAINABLE RESOURCES
CARBON FOOTPRINTS

The question received most frequently by the CSC is how individuals and institutions can calculate their own carbon footprints.

There are lots of carbon calculators available online. However, the carbon footprints of museums, galleries, exhibition installation, and art production are complex and specialized tools are required.

Western's Museum and Curatorial undergraduate program offers student training in carbon calculation and if the timing is right we are open to partnering with institutions, curators, and artists to help calculate carbon footprints.

Most calculators require extensive data gathering. This includes knowledge of physical plant and access to fuel and energy consumption, audience numbers and distance traveled, shipping, and travel (of curators). Granular detail of the carbon impact of materials used in the creation of art works and exhibition infrastructure can also be added. The amount of detail included in the inputs can affect the results, so it is necessary to track the same details in order to see changes over time.

We've rounded up some of the most useful calculation tools (there are others in the *Learn More* section of the *Resource Guide*):

For exhibitions, artists and institutions, Gallery Climate Coalition's free carbon calculator is very user friendly and has been widely tested. It also includes a clear guide and database.
Link to GCC carbon calculator

Creative Green Tools is Canadian-based. Their calculator is aimed primarily at theatre companies in Canada, but is also very useful for museums and galleries. CG specially consulted with Indigenous communities and actively foregrounds EDI-D in environmental steardship.
Link to CG Tools

Julie's Bicycle requires membership and is UK-based, but their Creative Climate tools have been well tested.
Link to Julie's Bicycle CC tools

Many institutions simply do not have the personnel or time required to calculate carbon footprints, and third parties are hired to at least provide base levels that can be used for comparison over time. The CSC can't really recommend companies to work with, but we do have connections with Rute Collaborative (Vancouver-based) and note that Artists Commit recommends The Carbon Accounting Company (Toronto-based).

LEARN MORE

URLS AND CONTACTS

The Synthetic Collective Offering a step by step guide to curating a sustainable exhibition, along with an exploration of the use of plastics in museums, the *DiY Fieldguide for Reducing the Environmental Impact of Art Exhibitions* can be downloaded from the solar powered website or the regular website:

plasticheart.solar (only works when the solar charger is charged, i.e. when it is sunny outside)

https://syntheticcollective.org/fieldguide/

Ki Culture has produced an extremely useful series of guides on lessening waste in curatorial and conservation practice, as well as reducing energy use in museums, and the links between human rights and sustainability. These are fantastic resources for institutions. Downloading the booklets requires a sign in, but the publications are free:

https://www.kiculture.org/ki-books/

CINAM's *The Toolkit on Environmental Sustainability in Museum Practice* provides lots of tips and great ideas for exhibition and event organization. It has recently been updated to include the social and economic aspects of sustainability:

CINAM toolkit website

Art/Switch hosts well-attended virtual conferences on sustainability in the arts:

https://www.artswitch.org/

The Coalition of Museums for Climate Justice lists organizations that incorporate the climate crisis in their programming and programming methodology:

https://cmcj.ca/

The Canadian Museums Association Sustainable Development Guide includes helpful guidelines for museums:

https://www.museums.ca/client/document/documents.html?categoryId=361

The Gallery Climate Coalition has many resources, including a simple and effective carbon calculator that is aimed at institutions but can also work well for student exhibitions. You can also become an individual, artist, or institutional member of the GCC:

https://galleryclimatecoalition.org/carbon-calculator/

The Best Practices Guidelines are also extremely useful for those looking for information on shipping, installing, packaging, waste etc.:

https://galleryclimatecoalition.org/guidelines/

STiCH or **Tools for Informed Sustainable Choices** is a massive database that allows users to compare the carbon footprint of products and materials frequently used in museums and art practices. They have a library of case studies (nitrile vs latex and cotton gloves; carbon footprints of museum loans etc.) and an easy to use carbon calculator. Highly recommended!

https://stich.culturalheritage.org/

@joanne_green_art is a frequently updated Instagram account with numerous recipes for making natural paints and dyes from plants and other natural materials, as well as tips on how to dispose of manufactured paints (such as acrylics) in environmetnally-responsible ways.

@greendesigns_ is an Instagram account dedicated to exploring new and sustainable materials. Many of their examples have applications in galleries and museums.

The Future Materials Bank is an archive of materials that supports and promotes the transition towards ecologically conscious art and design practices. This site is particularly useful for artists and those interested in experimental materials.

https://www.futurematerialsbank.com/

After curating the exhibition *The Waste Age*, **Design Museum UK** released their Environmental Impact Model and Guide. The documents include the key findings of their carbon impact audit, including tips and a very useful decision trees that can be followed for other exhibitions. The guides also include a list of materials to avoid, and possible alternatives.

https://designmuseum.org/learning-and-research/design-museum-research/working-to-make-change

Barder is peer-to-peer resource sharing for museums and galleries. Members post materials along with their location, and anyone can pick them up. Currently there are few posts from institutions in Southwestern Ontario, but the CSC encourages the use of this site!

https://www.barder.art/

Organized by artist and curator Suzanne Carte, **Artist Material Fund** circulates used gallery infrastructure in Southwestern Ontario. Organized as a series of pop ups, the AMF collects materials from museums and galleries and offers them for free to the community.

https://suzannecarte.com/amf/

The free publications produced by **Curating Tomorrow** are particularly useful for helping museums understand how they might respond to and achieve the UNSDG (United Nations Sustainable Development Goals). There are also publications on biodiversity protection, action for climate empowerment, and disaster risk reduction.

https://www.curatingtomorrow.co.uk/resources/

The **Canadian Conservation Institute** has many resources pertaining to sustainability, facilities assessments, preserving heritage collections, as well as in-depth research reports on LED lighting, effective packaging and transport for art, relative humidity (climate control), and crating.

CCI preserving heritage website

Artists Commit puts power in the hands of artists and independent curators, providing tools and resources to help artists and curators commit to climate action. If you are an artist or curator hoping to do a climate impact report on your own practice or exhibition, this is the place to go. The completed reports created by artists are full of interesting information.

https://www.artistscommit.com/

villa villa is a sustainable and climate-conscious arts programme and consultancy. The villa villa survey report documents how artists have tried to achieve sustainable practices as well as their motivations for doing so. villa villa also hosts residencies.

https://villavilla.co/

We Are Museums' visual road map and booklet *Museums on the Climate Journey* document how museums can become important centres for education on climate change and climate action.

Road map: https://wearemuseums.com/museumsonetheclimatejourney

Booklet link here

Through its digital condition reports and its Virtual Courier tool, **Articheck** is an international group dedicated to lessening the travel required by museum personnel, thereby reducing the carbon footprint of the sector.

https://www.articheck.com/

The **Centre for Sustainable Practice in the Arts** is based at York University. Though its focus is on theatre, the CSPA provides research, training, and consultancy services related to sustainable development, in particular ecological responsibility, in the arts and culture sector.The CSPA publishes a quarterly journal and oversees Creative Green Tools.

https://www.sustainablepractice.org/

Creative Green Tools Canada ("CG Tools") are a free set of carbon calculation and reporting tools that allow organizations in the arts and culture sector to record, measure and understand the impacts of their venues, offices, tours, productions, festivals and more. The CG Tools are available in French and English.

https://www.cgtoolscanada.org/

FOFA Gallery in Montreal has launched a program to explore sustainability across the arts and is collaborating with the CSC to produce a toolkit for sustainable alternatives to vinyl exhibition signage.

https://www.concordia.ca/finearts/facilities/fofa-gallery/sustainability.html

A collaboration between Evergreen Brickworks, the CSC, the Synthetic Collective, and the Indigenous Visual Culture Program at OCADU, **The Institute for Public Art and Sustainability** in Toronto was recently lauched to to drive sustainability from both an ecological and arts community lens with regards to art in the public sphere (website coming soon).

This is a fantastic resource from **EcoEnclose** on how different kinds of inks and printing stack up ecologically:

https://www.ecoenclose.com/blog/what-is-the-most-sustainable-ink/

The **Canadian Museum Association**'s *Moved to Action* toolkit is a vital resource for understanding how UNDRIP and the TRC Calls to Action must guide the museum sector's move to become more sustainable. *Moved to Action* is a response to Call to Action #67, to "call upon the federal government to provide full funding to the Canadian Museums Association to undertake, from collaboration with Aboriginal peoples, a national review of museum policies and best practices to determine the level of compliance with the United Nations Declaration on the Rights of Indigenous Peoples and to make recommendations."

https://museums.ca/uploaded/web/TRC_2022/Report-CMA-MovedToAction.pdf

STILL HAVE QUESTIONS? Visit the CSC at www.sustainablecurating or contact us at sustainable.curating@uwo.ca and we will do our best to answer your questions or direct you to already existing resources.

SYNTHETIC COLLECTIVE MANIFESTO

FOR CURATING AND MAKING ART IN A TIME OF ENVIRONMENTAL CRISIS

1. If you're going to make it, make it count.

2. Lead by example.

3. Take steps to mitigate environmental damage of art making and exhibitions. Doing so reveals other economies of inequality and acknowledges the art world's culpability in upholding systems of oppression. Projects should enhance initiatives aimed at preventing, reducing, and mitigating harm.

4. Learn about the toxicity and harm of materials involved in the production of artworks/exhibitions. Consider what is involved in their production and what that means for the environment. Weigh this information against point 1.

5. Reuse and recycling can happen at every stage: different aesthetics for exhibition curation that privilege reuse over new materials should become the norm.

6. Invest in alternate shipping systems and packing practices. Borrowing from a smaller geographic region, reusing packing materials and crates, and finding low-carbon methods of transportation should be standard.

7. Avoid transferring responsibility: carbon offsets alone are not enough and should be understood as greenwashing.

8. Negotiate exhibition, acquisition, and preservation policies. Upon the acquisition of artworks, artist contracts should include clear choices with regards to whether or not artworks should be preserved/conserved. Not all art works need to be thought of as permanent or unchanging.

9. Build circularity into in-house materials and energy use: use exhibitions to implement longer term strategies for carbon reduction, which may include contracts with museums or galleries for concrete measures to reduce fossil fuel dependency such as sourcing energy from green(er) suppliers or establishing exchange systems among local museums for exhibition furniture. Establish in-house standards and measurement protocols to reach targets. LEED programs are not enough if it means that new capital plans and building projects are foregrounded as the only way forward for museums.

10. Embrace enough: an aesthetic goal of achieving maximum impact with the minimum of resources. That goal requires drawing a line of "enough" at every decision point, including energy systems and work schedules.

The Synthetic Collective *espouses an approach of enough. We see this as meaning that ecological footprints must be taken into account when weighing aesthetic decisions. An aesthetic of enough is one that simultaneously acknowledges and values the past, present, and future—enough already!—in its refusal of high carbon, high energy, high waste productions. An approach of enough requires humility, and practicality: sustainability, in terms of resources and human energy, is directly linked to systems that can break if we overspend them. It means we should put in a lot of effort to build more equitable worlds, but that should be accompanied with an ethic of care, mindful that we don't burn out and the planet doesn't burn up. Enough is an aesthetic based in achieving maximum impact with the minimum of resources. Enough is a counterpoint to the implied goal of museum-standard perfection and a culture that valorizes work above all else.*

STUDENT PROJECTS

STUDENT CONTRIBUTIONS

"MAKING ECO-INK" AND HANDMADE PAPER

BY JAMIE SMITH

MAKING HANDMADE PAPER

Image 1. Final result

1. Procure unwanted newspaper.
2. Rip or cut newspaper into small pieces, approximately 2 x 1 inchs.
3. Soak paper bits in water for a minimum of 8 hours. See Image 2.
4. Put paper bits in a blender with water, blending to create a soupy pulp.
5. In a large bin, suspend pulp in water.
6. Distribute the pulp evenly across the surface of a screen, like a sieve. See Image 3.
7. Transfer the layer of pulp to a towel using sponges.
8. Dry the paper in the sun. Remove paper from the towel once it is dry.
9. Voila! Home-made, recycled paper!

"MAKING ECO-INK"

1. *Burn wood until charcoal forms. Wait for charcoal to cool.*
2. *Smash and grind charcoal into a fine powder, add Gum Arabic to mixture. See Image 4.*
3. *Mull mixture onto a glass plate until it is smooth. See Image 5 & 6.*
4. *Voila! Ink!*

Image 2.

Image 3.

Image 4.

Image 5.

Image 6.

Images provided by Jamie Smith.
Original images altered by dithering.

A WHOLE LOT OF TOXIC WASTEWATER: SUSTAINABLE PAINTING STRATEGIES BY MEGAN GODDARD

THE TOXICITY OF MANUFACTURED PAINTS

A toxicology report by Shammas et al. looked at expiry dates and toxicity on expired art materials and found that some materials only have a five year lifespan before release of chemicals and potential carcinogens in the paint (such as nickel, chromium, cadmium, and lead).[1]

As an alternative to manufactured paints (acrylics, oils, and watercolour) try to source locally produced, environmentally conscious paints, like those made by Beam Paints. Locally sourced and handmade within the M'Chigeeng First Nation on Manitoulin Island, Beam Paint's recipes utilize waste stream stone from local quarries.[2]

CAN WE USE MUSHROOMS TO FILTER WASTEWATER?

This zine (see following page) considers using mushrooms as absorbant material against heavy minerals and metals found in the run-off water from painting. This run-off produces "paint particles." 70% of this paint wastewater passes any kind of filtration treatment, and only 25% evaporates. [3] The larger pieces often settle in soil or sediment and become an unmovable sludge. In most cases, paint wastewater is not considered a kind of microplastic, despite their effects on various species and biomes.[4]

New studies are looking for organic and natural ways of solving this problem. Mushrooms have been suggested as a potential, specifically for drawing out and absorbing heavy metals.[5] They can absorb both essential and non-essential metals, are widely grown all over the world, and the mycelia of the mushrooms can act as a biological filter.[6]

1 Masood A. Shammas, Samiyah A. Rajput, Dildar Ahmad, Masood Ahmed, Zahid Mustafa, and Gulzar Ahmad, "Inclusion of 'Toxicological Review Expiry Dates' in Art Material Labels May Further Reduce the Risk of Chronic Toxicity, Including That of Cancer," in *Frontiers*, January 3, 2016, 1, doi: https://doi.org/10.3389/fonc.2016.00004
2 "Indigenous Paint Company Beam Paints Goes Plastic-Free," *Clean50*, Delta Management Group, October 5, 2021. https://clean50.com/projects/putting-more-green-on-the-palette-as-the-first-indigenous-paint-manufacturer-and-first-plastic-free-paint-manufacturer-in-the-world-beams-creativity-innovation-and-determination-are-showin/.
3 Surya Nair, "Sustainable Treatment of Paint Industry Wastewater: Current Techniques and Challenges," *Journal of Environmental Management*, Academic Press, June 30, 2021, doi: https://doi.org/10.1016/j.jenvman.2021.113105
4 Andrew Turner, "Paint particles in the marine environment: An overlooked component of microplastics," *Water Research X* 12 (2021): 100110, doi: https://doi.org/10.1016/j.wroa.2021.100110.
5 Ab Rhaman, Siti Maryam Salamah, Laila Naher, and Shafiquzzaman Siddiquee, "Mushroom Quality Related with Various Substrates' Bioaccumulation and Translocation of Heavy Metals," *Journal of Fungi* 8, no. 1: 42 (2002), doi: https://doi.org/10.3390/jof8010042.
6 Ibid.

MUSHROOM FILTERS!

AND OTHER FACTS ABOUT PAINT BASED WASTEWATER.

A ZINE BY MEGAN GODDARD

- paints often contain pigment & acrylic, polyurethane, epoxy or chlorinated rubber binders.
- it's used on all kinds of surfaces, such as boats, buildings, roadways & for art and other personal use.
- paint has a high chemical toxicity due to the use of inorganic additives, and should be recognized as microplastics.

- microplastics: synthetic or non synthetic materials constructed of polymers or additives that are <5mm in diameter

- paint manufacturers use large quantities of water & chemicals, nearly 70% of this paint wastewater is released untreated & only 25% evaporates.

- paint particles that are more dense sink and are less mobile, this sludge is a substantial waste byproduct.
- land based sources of paint move to the ocean via urban runoff.
- directly poisons animal biomes and plants, leaching into the soil and sediment in water bodies
- detected in digestive tracts of marine animals, fish, crustaceans & bacteria.

- proposed solutions found in physicochemical treatment: processes such as sedimentation, coagulation, flocculation & filtration, which all try to separate particles, they can also be separated further via filters.
- treatability is also important to latex paint, the more polymer there is, the more solids there is to remove

- bio-coagulation using seeds, mucilage or leaves which work to neutralize.
- advantages include cost effectiveness, biodegradability, producing toxin free treated water & low sludge volume.
- we can use microorganisms to eliminate metals at a low cost!!

- What if we made a filter from mushrooms?
- mushrooms can easily absorb heavy metals from the environment, due to the ability to undergo the mycoremediation process.
- mushrooms can bioaccumulate heavy metals, depending on chemistry of ion metals, cell wall compositions, physiology and phytochemical factors (time, temp, etc).
- essential metals such as iron, copper, manganese and zinc, and non essential metals like lead, cadmium and arsenic can be absorbed.

- accumulation of metals varies on the type of mushroom, some are more capable of absorbing different metals

- for example *p. sajor-caju* could absorb cadmium, copper, nickel, iron & lead.
- the best part? Most of these mushrooms are widely grown around the world, in forests!!

- put into a pipe system, mushrooms could help clean the water!
- the reason they can absorb is they contain lots of hyphae in the mycelium, that help with the bioabsorption of nutritive elements and heavy metals, attracting metals & other chemical components.
- mycelia in mushrooms can act as a biological filter!

Citation:
Nair, Surya. "Sustainable Treatment of Paint Industry Wastewater, Current Techniques and challenges," Journal of Environmental Management June 30, 2021. Turner, Andrew. "Paint Particles in the marine environment: an overlooked component of microplastics," Water Research X, 2021.
Rhaman, Ab et al., "Mushroom Quality Related with Various Substrates' Bioaccumulation and Translocation of Heavy metals" Journal of fungi 8, no 1: 42. MDPI

RECLAIMING WASTE CLAY
BY: MAY WALPOLE

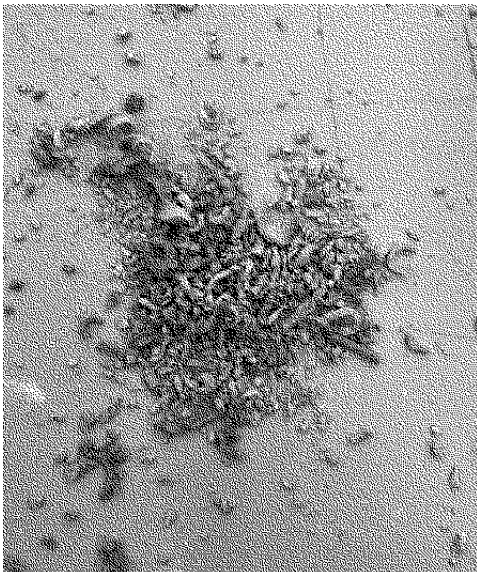


Image 1.

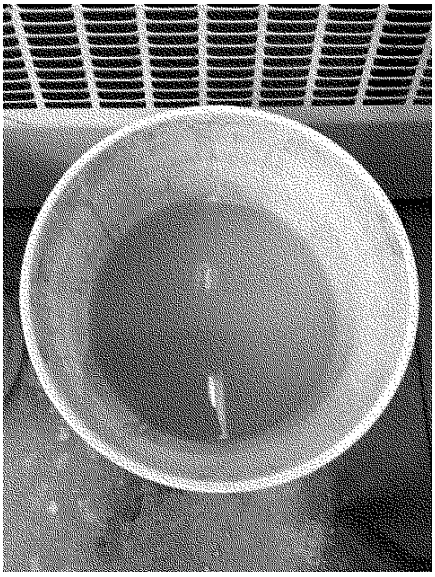


Image 2.


Image 3.

PREPARING RECYCLED CERAMIC CLAY

1. Gather clay offcuts and dissolved clay. You can collect shavings from trimming other projects, and/or washing water with dissolved clay in it. Add shavings and offcuts to a bucket of clay-water. See Image 1.

2. Allow the clay time to settle to the bottom of the bucket and clump together. Drain the top layers of water, allowing the clay to resettle repeatedly until the excess water is drained out, leaving only the wet clay. NOTE: The waste water can be high in bacteria, do not re-use it. See Image 2 & 3.

3. Once the water has largely evaporated or drained, it must be dried further. Using a concrete or drywall palette, leech the remaining moisture. Occassionally flip and redistribute the clay across the board to ensure it is drying. See Image 4 & 5.

4. Once the clay has dried to a workable consistency, it can be wedged. Knead the air out of the clay, preventing air bubbles. Push the clay away from your palms, fold it in on itself, and push again. Keep the clay in the shape of an inverted triangle with the point between the palms of your hands. Repeat this motion over 100 times. See Image 6.

5. Next, check for air. Pat and roll the clay into a cylinder, and cut through the middle with a wire tool. If there are any air bubbles, repeat Step 4 until there are no more air bubbles. See Image 7 & 8. Now your clay is ready to make ceramics!

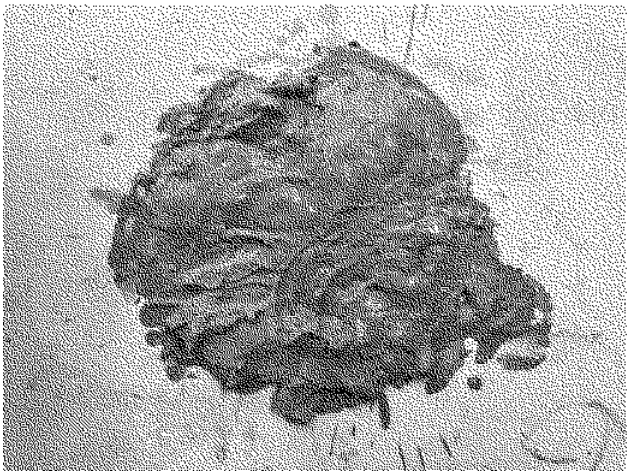


Image 4.

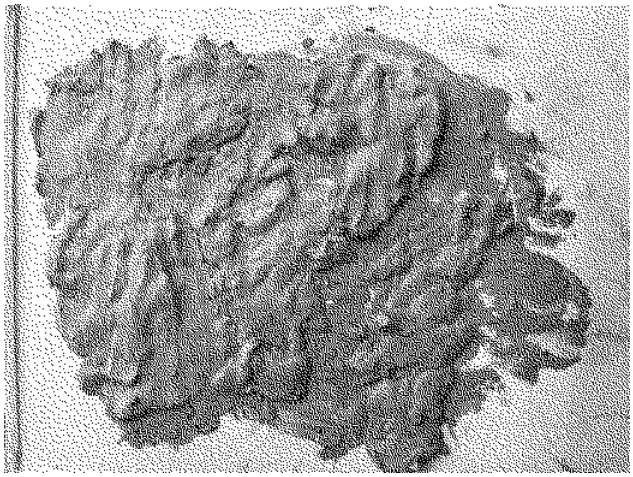


Image 5.

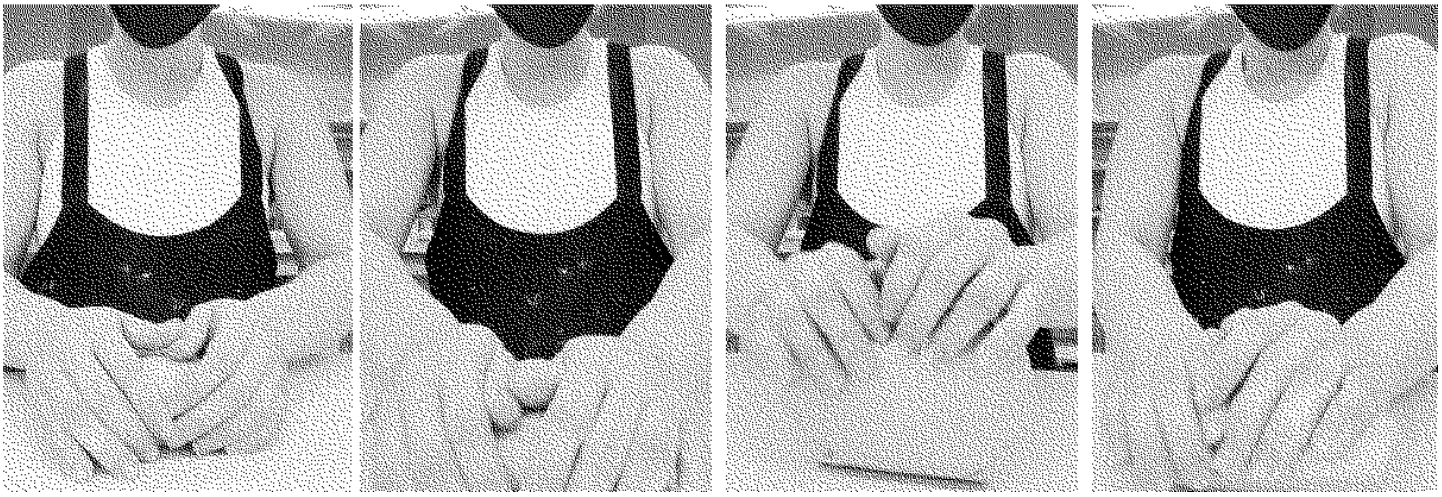


Image 6.

Image 7.

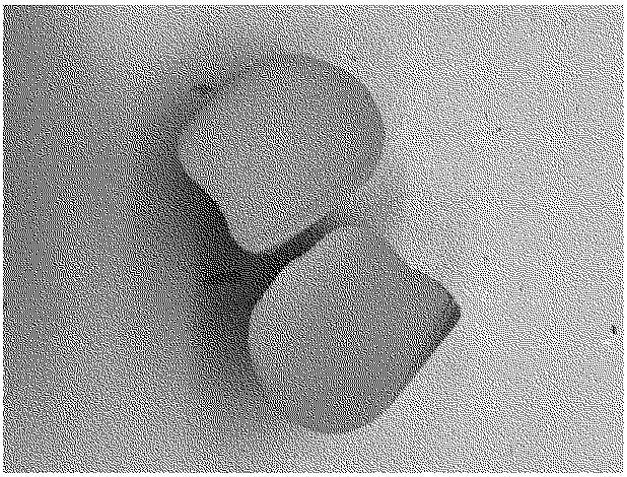


Image 8.

Images provided by May Walpole.
Original images altered by dithering.

WHAT WE LEARNED

It's tough to navigate what is really sustainable and what is greenwashing. This is especially true for printing and waste disposal. We had many disappointing phonecalls! Hopefully this guide will help you to make more sustainable decisions and to learn what to look for. We also learned a lot about making our guide and files more accessible. Our intention is to share the source files so that anyone else can adjust and use for their own location. However, because we used proprietary software, the files won't be as open as we hoped - other editors will need to use the same software. Lesson learned - next time we will start with open source and freely available editing software. This guide is a living document and will be updated frequently. Please feel free to contact us to suggest updates.

WHAT WE'RE WORKING ON

There are a number of projects underway at the CSC that we hope to complete by the end of 2024. These include:

- *A project to develop local alternatives to carbon offets.*
- *Translations of the Resource Guide into French and into a more accessble low-data plain text format.*
- *Open source syllabi on museums and sustainability for undergraduates, graduates, and those who are interested but do not have access to university libraries and academic publications behind paywalls.*
- *A workshop series aimed at students and emerging professionals.*

In Spring 2023, the CSC reached out to 1,195 museums in Canada seeking information on how museums are approaching sustainability and what museum personnel might want to know. Over the next year, we'll be using this information to guide our research. Some of the areas of interest include:

- *How can museums that are in rented or heritage facilities lower their carbon footprints?*
- *What options are available to remote institutions that may not be able to procure green materials?*
- *How can museums and galleries access and better understand the full life-cycle of materials used in installation and conservation/storage?*
- *Is a zero-waste opening reception possible?*
- *What are the most cost-effective methods of becoming more sustainable? That is, can museums become more sustainable without buying anything new?*

The CSC can help with questions like these, directing to already existing resources, providing answers where possible, or potentially undertaking new research. Don't hesitate to reach out if you have a question: sustainable.curating@uwo.ca

www.sustainablecurating.ca

email: sustainable.curating@uwo.ca

Instagram: @centreforsustainablecurating

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